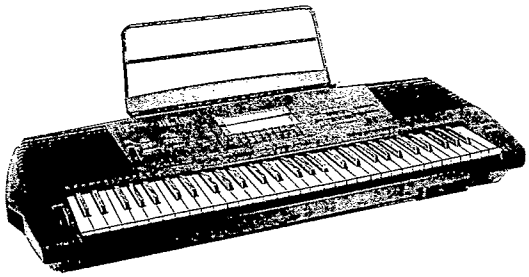
ORDER NO. EMID961616
A5

Service Manual

PCM Keyboard

SX-KN920



(M), (MC), (XM), (EN), (EH), (EF), (EZ), (EW), (EA), (EP), (EK), (XL), (XR), (XS), (XD), (XT), (X), (XP)

AREAS

(M): U.S.A.
(MC): Canada
(XM): Mexico
(EN): Norway, Sweden Denmark, Finland
(EH): Holland, Belgium,
(EF): France, Italy
(EZ): Germany
(EW): Switzerland
(EA): Austria
(EP): Spain, Portugal, Greece, Singapore, South Africa
(EK): the United Kingdom
(XL): New Zealand
(XR): Australia
(XS): Malaysia
(XD): Saudi Arabia, Hong Kong, Kuwait
(XT): Taiwan
(X): Thailand, Indonesia, Iran, U.A.E., Panama, Argentina, Peru, Brasil
(XP): Philippines

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

■ Specification

KEYBOARD	61 KEYS (WITH INITIAL TOUCH)
SOUND GENERATOR	PCM
MAXIMUM NUMBER OF NOTES PRODUCED SIMULTANEOUSLY	32 NOTES
SOUNDS	200 SOUNDS
EFFECTS	DIGITAL EFFECT, DSP EFFECT, SUSTAIN, DIGITAL REVERB
SOUND EDIT	MEMORY : 40
TRANSPOSE	G–C–F#
RHYTHM	128 × 4 VARIATIONS
CONTROLS	MAIN VOLUME, BALANCE, MUTE, SPLIT POINT, CONDUCTOR START/STOP, INTRO & ENDING 1,2, FILL IN 1,2, COUNT INTRO, SYNCHRO & BREAK, TEMPO,
MANUAL SEQUENCE PADS	12 BANKS × 6 PADS, 1 USER BANK: 1200 NOTES, RECORD/STOP
AUTO PLAY CHORD	MODE : ONE FINGER, FINGERED, PIANIST, MEMORY, ON BASS, MUSIC STYLE ARRANGER, SOUND ARRANGER
ONE TOUCH PLAY	○ (ONE TOUCH PLAY/MUSIC STYLE SELECT)
TECHNI-CHORD	○
PANEL MEMORY	2 BANKS × 5
SEQUENCER	16 TRACKS, 10 SONGS RESOLUTION : 96 PULSES PER QUARTER-NOTE STORAGE CAPACITY : APPROX. 30000 NOTES RECORD MODES : EASY, REALTIME,STEP(CHORD,RHYTHM) FUNCTIONS : TRACK ASSIGN, EDIT, SONG SELECT/NAME,MEDLEY
COMPOSER	5 PARTS : BASS, ACCOMP 1,2,3, DRUMS STORAGE CAPACITY : APPROX. 10000 NOTES FUNCTIONS : BEND RANGE, MODE SELECT, PATTERN COPY, SINGLE LOAD, CHORD MAP MEMORY : 3 BANDS × 10(VARIATION 1–4, INTRO 1,2, FILL IN 1,2, ENDING 1,2)

Technics

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MEMORY & CONTROL	INITIAL, FOOT SWITCH SET, DIRECT PLAY, DISK LOAD, DISK SAVE, DISK FORMAT, CONTRAST
SOUND SETTING	PART SETTING, KEY SCALING, TOUCH & TUNE, LEFT HOLD
MIDI	CHANNEL, PART SETTING, COMMON SET, CONTROL MESSAGE, IN/OUT SET, REALTIME MESSAGE, MIDI PRESETS, GM MODE, BULK DUMP
EXTERNAL MEMORY	BUILT-IN 3.5 INCH FLOPPY DISK DRIVE FOR 2HD(1.44 MB), 2DD (720 KB)
DISPLAY	LCD (PAGE, EXIT, DISPLAY HOLD)
DEMO	○
TERMINALS	PHONES/LINE OUT, FOOT SW, MIDI (IN, OUT), DC IN 12V
OUTPUT	1.5W × 2 (WITH BATTERIES), 8W × 2 (WITH SY-AD6/AD6B AC ADAPTOR)
SPEAKERS	12cm × 2
POWER REQUIREMENT	BATTERIES: DC 9V (USING R20/LR20 ["D" SIZE, UM-1] BATTERIES × 6
	AC: WITH SY-AD6 AC ADAPTOR — AC 120/220/230/240V 50/60Hz AC 120V 60Hz (NORTH AMERICA AND MEXICO) AC: WITH SY-AD6B AC ADAPTOR — AC 230V 50/60Hz (EUROPE EXCEPT FOR UNITED KINGDOM)
DIMENSIONS (W × H × D)	105.7 cm × 14.9cm × 40.4cm (41-5/8" × 5-7/8" × 15-29/32) WITHOUT MUSIC STAND, BATTERIES
NET WEIGHT	8.8kg (19.4lbs.) WITHOUT MUSIC STAND, BATTERIES
ACCESSORIES	MUSIC STAND

•Specification are subject to change without notice for further improvement.

WARNING

To prevent the risk of fire, or electrical shock and to ensure safe operation, please be sure to follow the safety guidelines below.

1. At places where special caution is required, the necessary safety precautions are clearly labeled or printed, for example, on the cabinet, or on the part concerned. Please follow these safety precautions, and also those listed in the Owner's Manual.
2. Parts which have a ⚠ mark in the circuit diagram or in the parts list are essential for safety. When replacing these parts, be sure to use only the specified parts.
3. Use the specified types for internal wiring (double-insulated wiring, etc.).
4. When replacing parts on the AC primary side (power transformer, electric switch, electrical cord, noise-prevention condenser, etc.), wind the lead wire and secure it by soldering.
5. Do not let the wiring come into contact with heat-emitting devices (fuse resistor, radiator plate, etc.).
6. When replacing the wiring, make sure that it is not in contact with the unfinished or rough edge of a part.
7. When replacing the power cord (except for the plug-in type), tug it from various directions to confirm that it does not slip out of place.
8. Spacing
   If soldering was done on the AC primary circuit, confirm that the interval between the soldered terminals or between the terminal and surrounding metallic parts is at least the minimum required (Between the primary circuit and the chassis: at least 6.5mm; between primary circuit terminals: at least 4.0mm; between primary circuit terminals and secondary circuit terminals: at least 6.5mm.).

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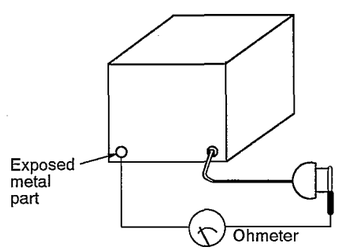
SAFETY PRECAUTION

● Safety Precaution

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacture's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● Insulation Resistance

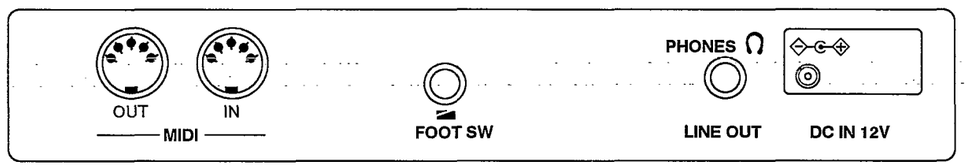
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw heads, connectors, control shafts, handle brackets, etc.. Measurements should range from 4MΩ to infinity for all exposed parts.



Resistance = 4M Ω to ∞

TERMINALS

(Rear panel)



FOOT SW
An optional SZ-P1 Foot Switch (sold separately) can be connected to each terminal to control various functions.

PHONES/LINE OUT (output level 1.5 Vrms, 16 Ω)
Headphones, a keyboard amplifier, or stereo equipment can be connected to this terminal. When another apparatus is connected to this terminal, the speaker system is automatically switched off, and sound is heard only through the connected device.

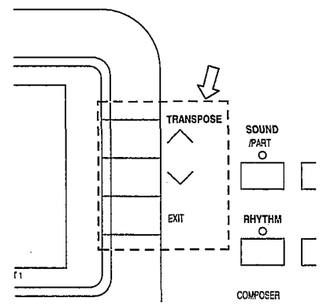
MIDI
These terminals are for connection to another MIDI instrument.

INITIAL SETTING

■ The initial setting function is used to return to the original factory settings, and to reset the customer settings and misoperations.

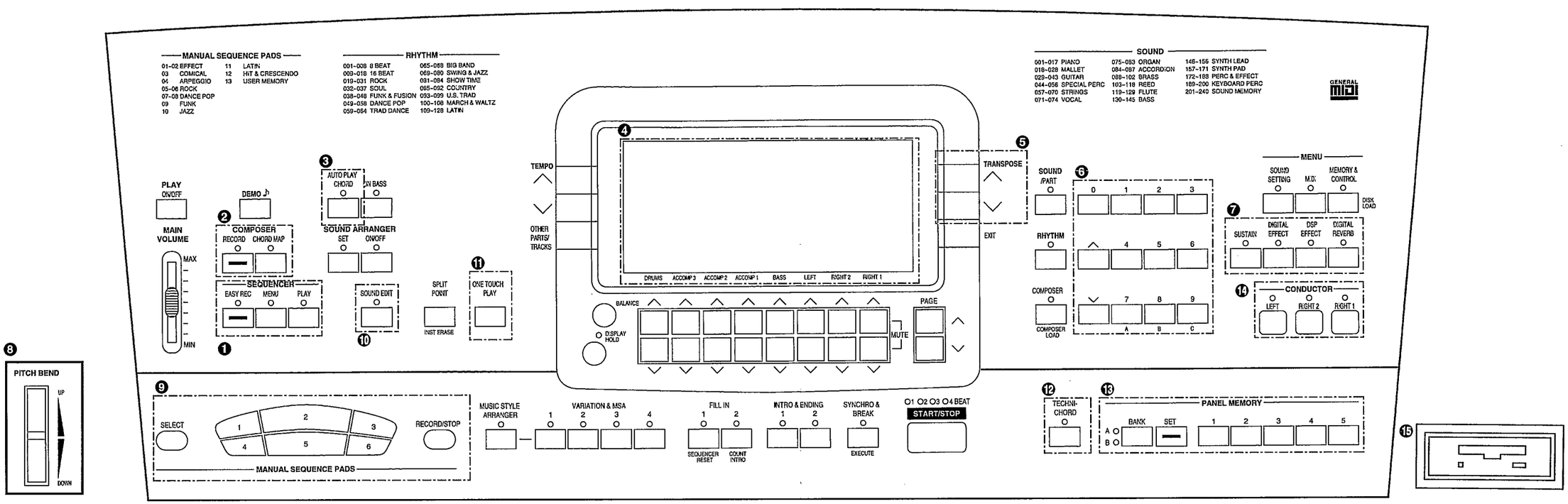
1. Press the **PLAY** button to turn off the instrument.

2. While pressing the three buttons to the right of the display, (**TRANSPOSE** ∧ and ∨ ,and **EXIT**) at the same time, turn the **PLAY** button on again.



NOTE:
All stored data in the **SEQUENCER** and **COMPOSER** and other setting are initialized with this operation.

CONTROLS AND FUNCTIONS



❶ SEQUENCER
A sequencer records your performance in a similar way to a tape recorder. This instrument's **SEQUENCER** allows you to record up to 10 performances in a variety of ways.

❷ COMPOSER
The **COMPOSER** enables you to create your own accompaniment patterns or to edit preset accompaniment patterns. A pattern is comprised of five parts: **DRUMS, BASS** and three **ACCOMP** parts. These parts would form the backing of a song, for example: Drums, Accoustic Bass, Piano, Jazz Guitar and Vibes. You may find it useful at first to copy and edit a preset pattern.

❸ AUTO PLAY CHORD
Simply by playing a chord on the keyboard, the **AUTO PLAY CHORD** function automatically plays an accompaniment pattern which matches perfectly the selected rhythm. With a real accompaniment as a background, you can concentrate on playing the melody.

❹ DISPLAY
Displays performance information, function settings and other messages.

❺ TRANSPOSE
The **TRANSPOSE** buttons are used to changed the key of the entire instrument in semitone steps across an entire octave.

❻ Number pad
Use the number pad to select sounds and rhythms by their numbers.

❼ Effects
Add various effects to the sounds. **DIGITAL EFFECT** gives the sound richness and enhances your performance. **DSP EFFECT** adds unique quality to the sound. **SUSTAIN** is the gradual fading out of musical tones after the key is released. **DIGITAL REVERB** applies a reverberation effect to the sound.

❽ PITCH BEND/MODULATION
The pitch of the instrument can be continuously changed with the **PITCH BEND** wheel at left end of the keyboard. Using this control, you can produce the effect of bending the strings on a guitar.

❾ MANUAL SEQUENCE PADS
Add various phrases to your performance with the pad buttons.

❿ SOUND EDIT
SOUND EDIT enables you to create your own new sound by altering one of this instrument's preset sounds. Your new sound can be stored in one of the sound memory locations.

⓫ ONE TOUCH PLAY
ONE TOUCH PLAY sets up the your instrument with a suitable registration for your chosen rhythm style so that you can make a great sound straight away, even if you are playing this instrument for the first time. Using **ONE TOUCH PLAY** sets a suggested combination of sounds and balances and an appropriate tempo for the rhythm style at the push of a button.

⓬ TECHNI-CHORD
TECHNI-CHORD turns your single-note melodies into full chords and offers you a choice of 13 different types, from a simple duet which adds one harmony note to your melody note, to big band reeds which adds four harmony notes to your melody note.

⓭ PANEL MEMORY
PANEL MEMORY stores the panel set up of this instrument allowing you to make complex changes at the push of a single button.

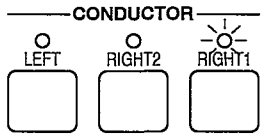
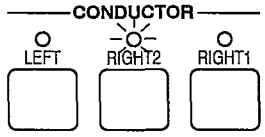
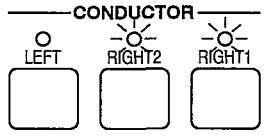
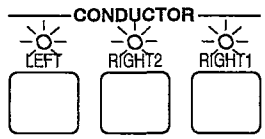
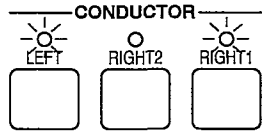
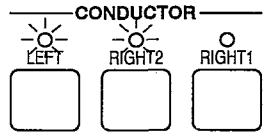
⓮ CONDUCTOR
The **CONDUCTOR** buttons are used to assign sounds to the keyboard in many different ways. For example, you can assign two sounds to the entire keyboard so that playing one key will produce two sounds. You can even split the keyboard into right and left sections (SPLIT), and assign a different sound to each section.

⓯ DISK DRIVE
This Disk Drive allows you to store **SEQUENCER** performance and other data on 3.5-in. 2DD/2HD memory disk.

CONDUCTOR SETTINGS

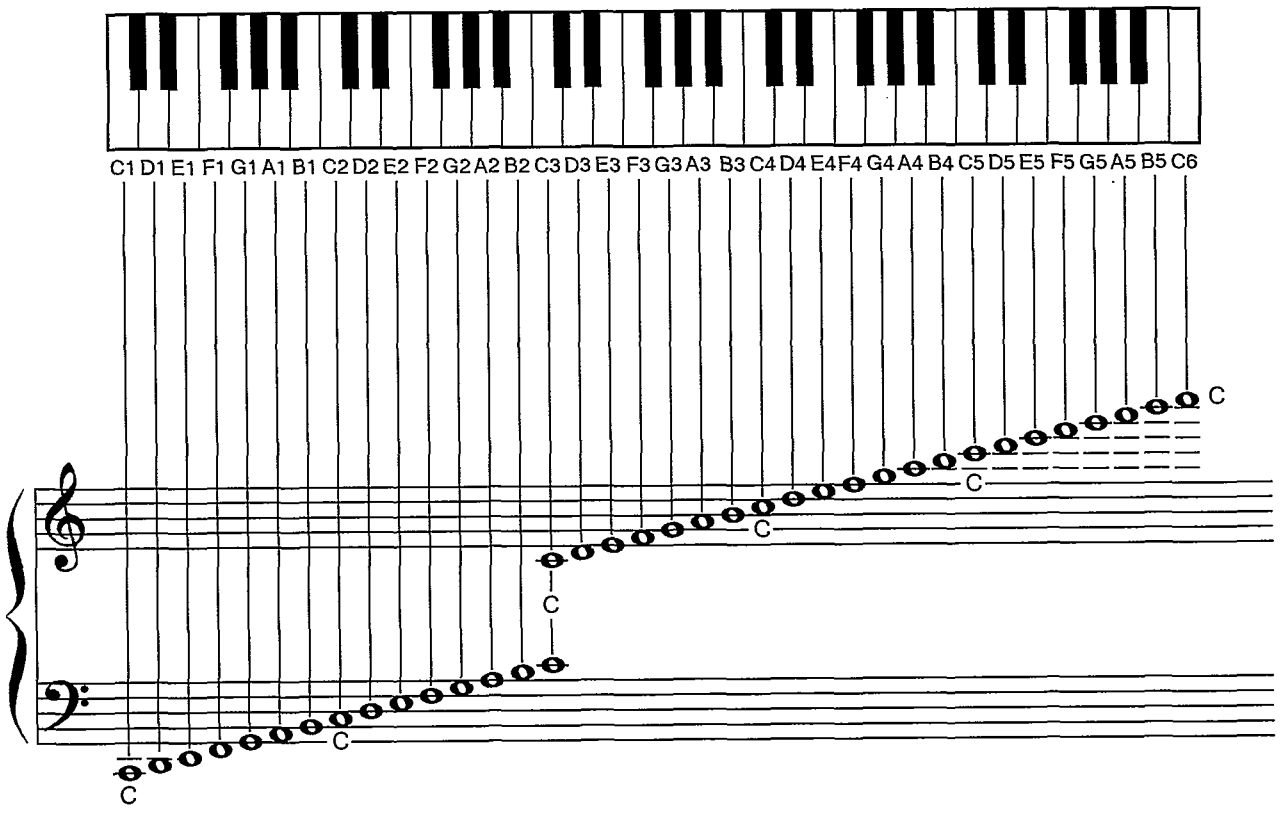
The **CONDUCTOR** buttons are used to assign sounds to the keyboard in many different ways. For example, you can assign two sounds to the entire keyboard so that playing one key will produce two sounds. You can even split the keyboard into right and left sections (**SPLIT**), and assign a different sound to each section.

CONDUCTOR

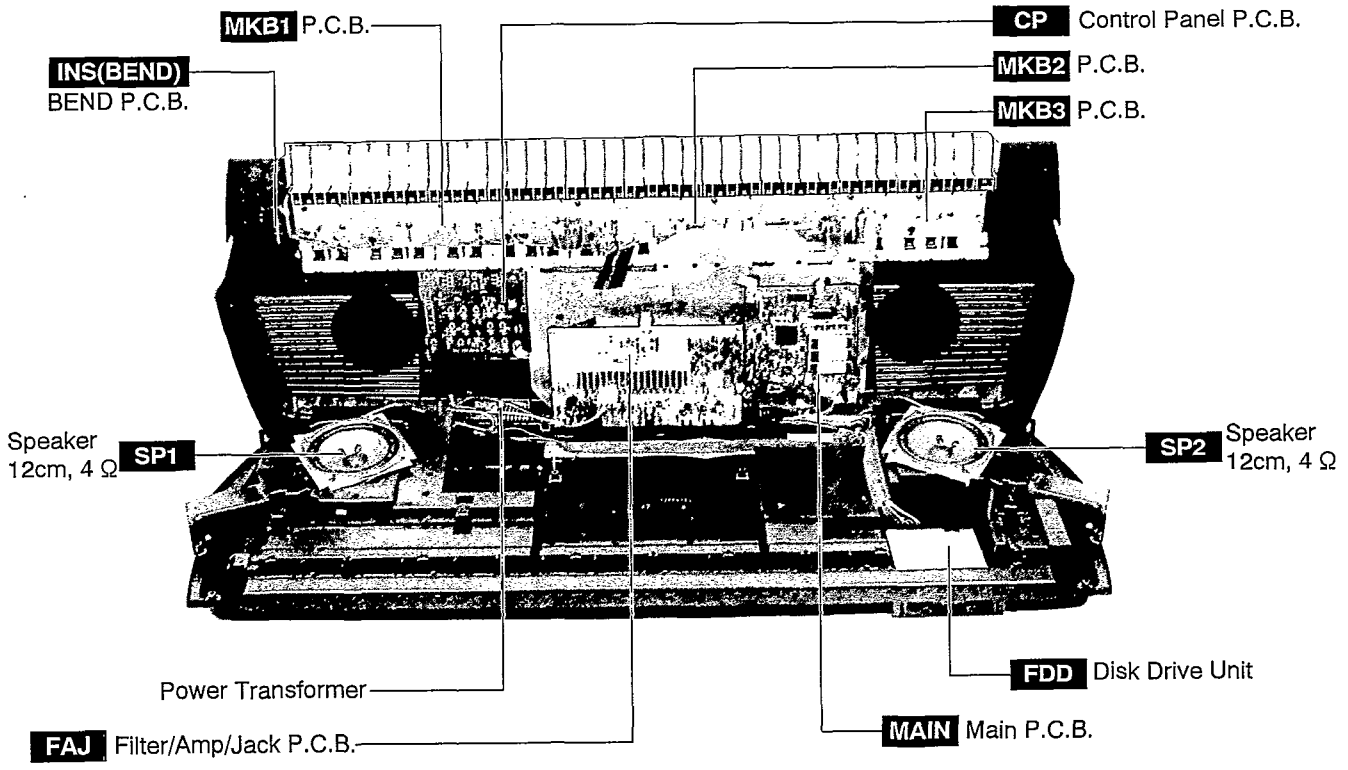
CONDUCTOR settings	How sounds are assigned to the keyboard
	All keys produce the **RIGHT1** sound. **RIGHT 1**
	All keys produce the **RIGHT2** sound. **RIGHT 2**
	All keys produce both the **RIGHT1** sound and the **RIGHT 2** sound. **RIGHT 1 + RIGHT 2**
	The left keys produce the **LEFT** sond and the right keys produce the **RIGHT 1** sound and the **RIGHT 2** sound. **LEFT** / **RIGHT 1 + RIGHT 2**
	The left keys produce the **LEFT** sond and the right keys produce the **RIGHT 1** sound. **LEFT** / **RIGHT 1**
	The left keys produce the **LEFT** sound and the right keys produce the **RIGHT 2** sound. **LEFT** / **RIGHT 2**

KEYBOARD RANGES

This keyboard features Touch Response, by which you control the volume by playing the keys harder or softer.



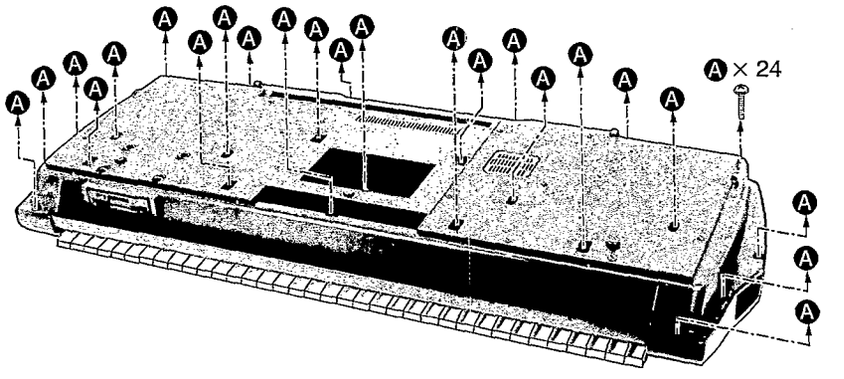
PARTS LOCATION



DISASSEMBLY INSTRUCTIONS

1 Opening the cabinet

1. Turn the keyboard cabinet upside down as shown in Fig. 1, and remove the bottom screws (Ⓐ 24 pcs.).
2. Place the keyboard bottomside down, and open the top cabinet.



[Fig. 1]

2 Removing the MAIN, FAJ, CP, LMP1, LMP2 and LCD printed circuit boards

• Open the cabinet (see step 1).

MAIN P.C.B.

• Remove the MAIN P.C.B. mounting scrwes (Ⓑ 4 pcs.).

FAJ P.C.B.

• Remove the FAJ P.C.B. mounting screws (Ⓒ 6 pcs. and Ⓓ 3 pcs.).

CP P.C.B.

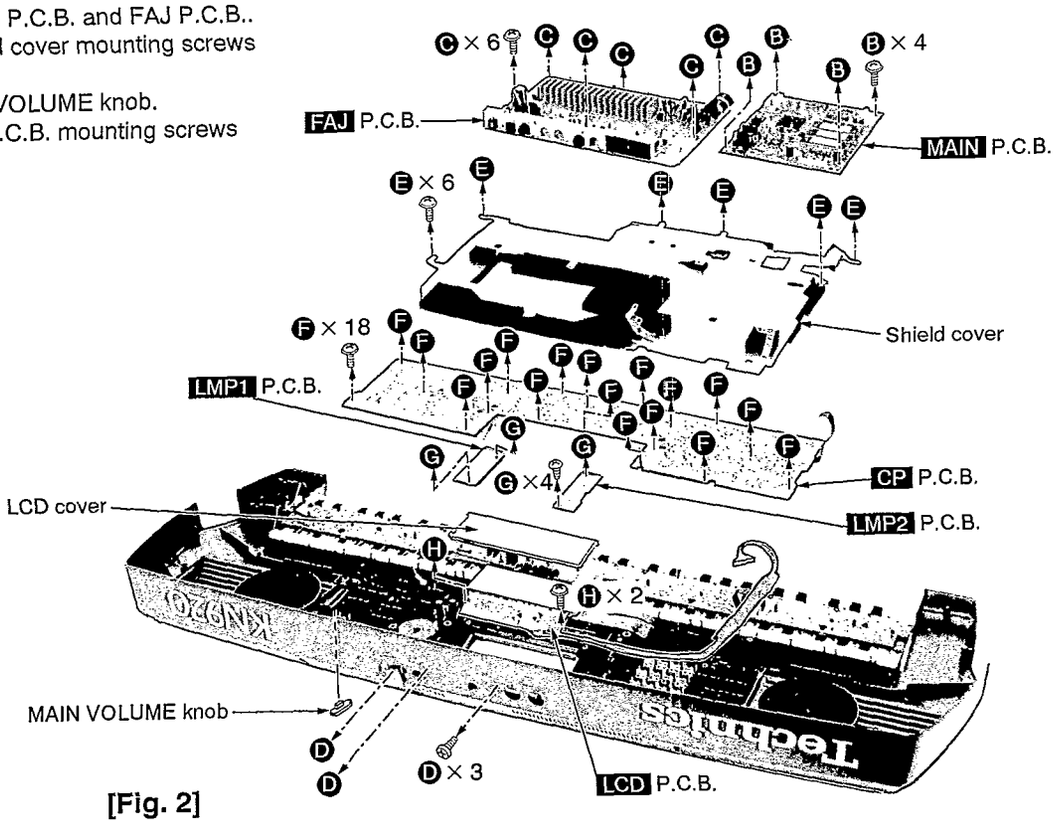
1. Remove the MAIN P.C.B. and FAJ P.C.B..
2. Remove the shield cover mounting screws (Ⓔ 6 pcs.).
3. Pull off the MAIN VOLUME knob.
4. Remove the CP P.C.B. mounting screws (Ⓕ 18 pcs.).

LMP1, LMP2 P.C.B.

1. Remove the MAIN, FAJ and CP P.C.B..
2. Remove the LMP1 and LMP2 P.C.B. mounting screw (Ⓖ 4 pcs.).

LCD P.C.B.

1. Remove the MAIN, FAJ, CP, LMP1, and LMP2 P.C.B..
2. Remove the LCD cover.
3. Remove the LCD P.C.B. mounting screws (Ⓗ 2 pcs.).



[Fig. 2]

3 Removing the INS, MKB1, MKB2 and MKB3 printed circuit boards

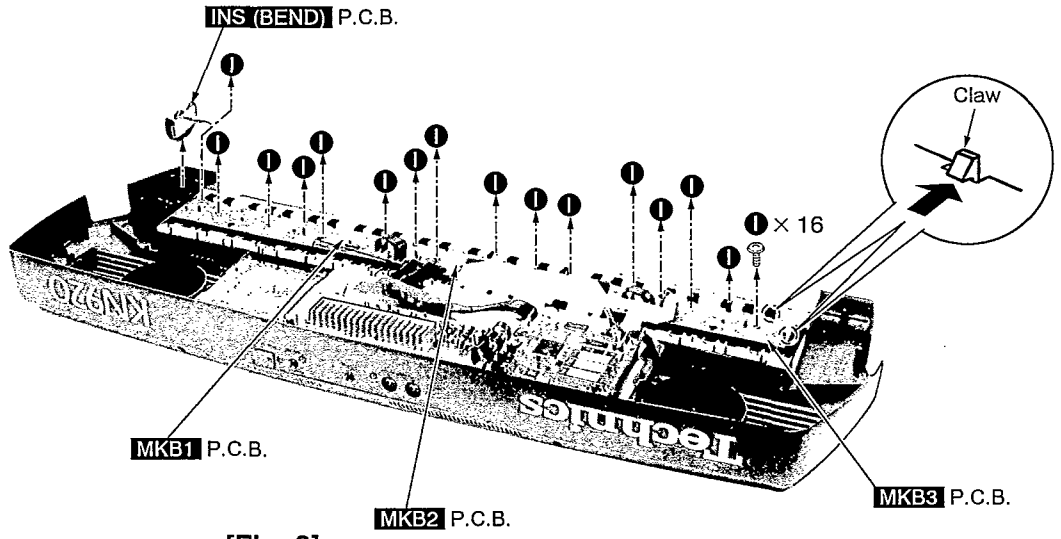
• Open the cabinet (see step 1)

INS (BEND) P.C.B. Ass'y

1. Pull out the INS P.C.B. ass'y from the cabinet.

MKB1, MKB2, MKB3 P.C.B.

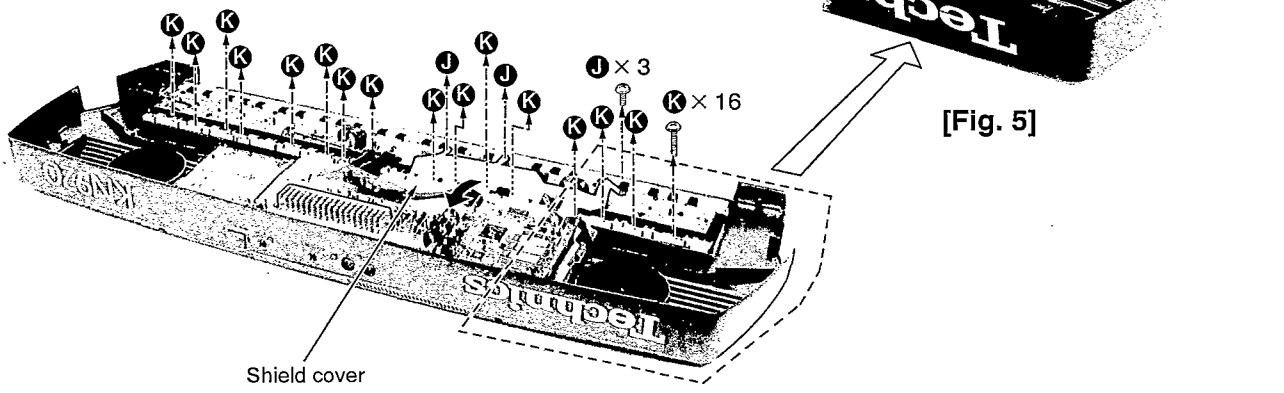
1. Remove the MKB1, MKB2 and MKB3 P.C.B. mounting screws (❶ 16 pcs.).
2. Release the claws (21 points).



[Fig. 3]

4 Removing the keyboard unit

1. Open the cabinet (see step 1)
2. Remove the shield cover mounting screws (❸ 3 pcs.), and then bend the shield cover in the direction of arrow.
3. Remove the keyboard unit mounting screws (❹ 16 pcs.).



[Fig. 5]

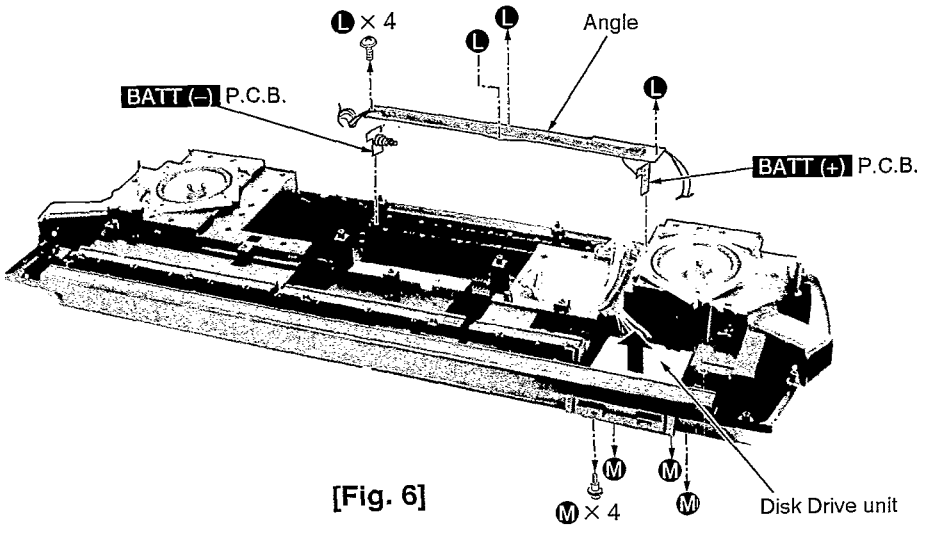
[Fig. 4]

5 Removing the BATT (+) and BATT (–) printed circuit board

1. Open the cabinet (see step 1)
2. Remove the angle mounting screw (Ⓛ 4 pcs.).
3. Pull out the BATT (+) and BATT (–) P.C.B. from the cabinet.

6 Removing the Disk Drive unit

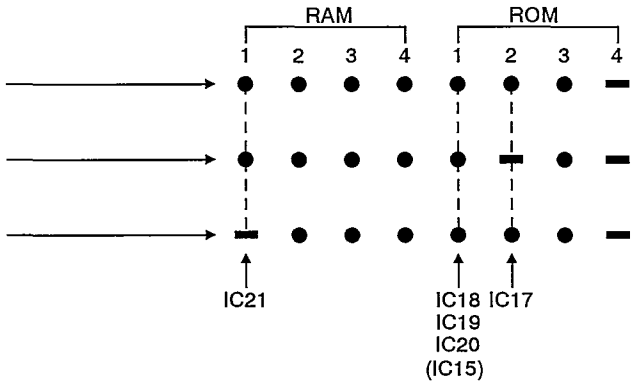
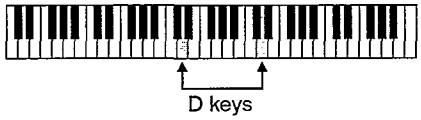
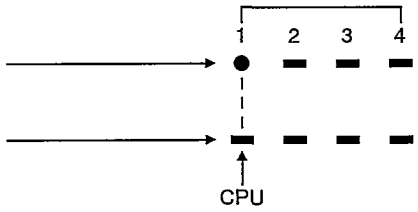
1. Open the cabinet (see step 1)
2. Remove the Disk Drive unit mounting screws (Ⓜ 4 pcs.).

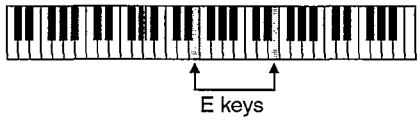
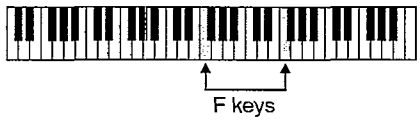
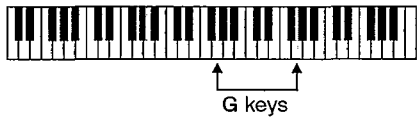


[Fig. 6]

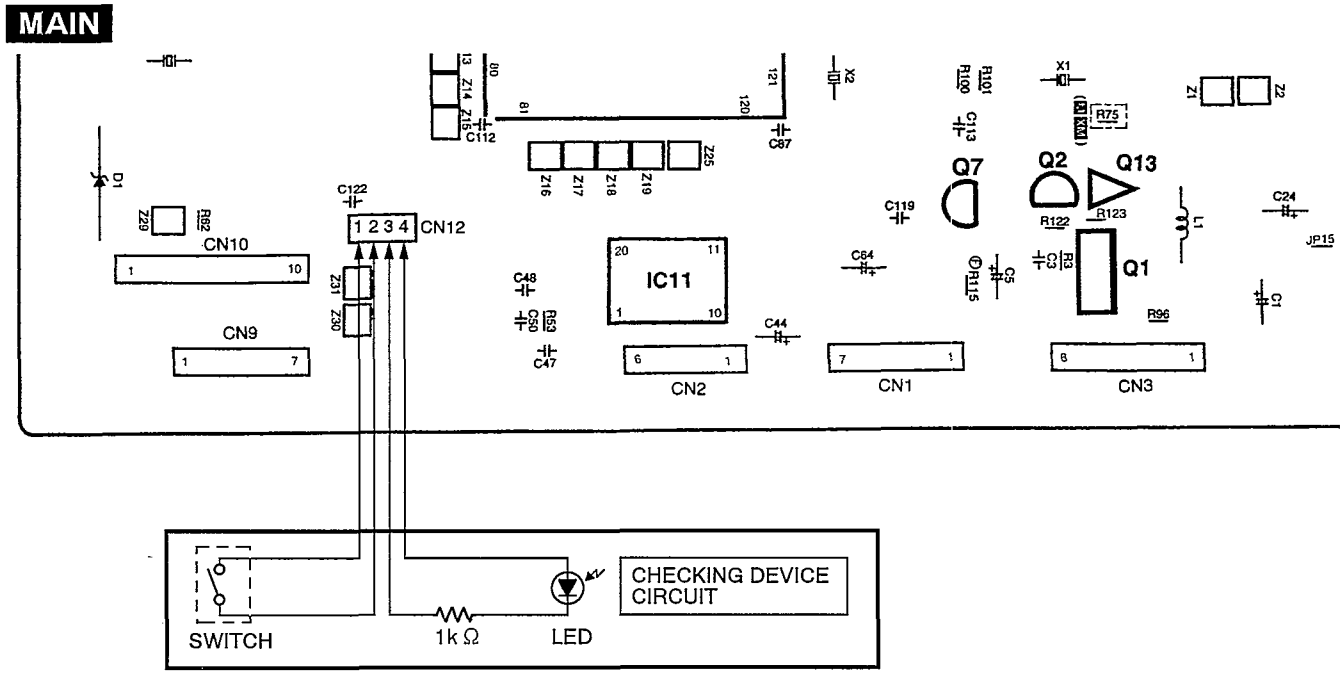
ABOUT THE SELF-DIAGNOSTIC FUNCTION

This model has some self-diagnostic capabilities. When set to the self-diagnostic mode, operation of various components can be verified by following the procedures in the chart below.

<table>
<tr><th>No.</th><th>PCB</th><th>TEST MODE</th><th>Procedure</th></tr>
<tr><td>1</td><td>MAIN</td><td>RAM (IC21), ROM (IC15, IC17-20) check</td><td>1.Connect the CHECKING DEVICE (refer to page I-12) to CN12 on the MAIN P.C.B. , and turn on the CHECKING DEVICE switch.
2.Turn on the power switch.</td></tr>
<tr><td colspan="4">When the power switch is turned on, the LED of the CHECKING DEVICE flashes 8 times. The first 4 flashes are for the RAM check, and the latter 4 flashes are for the ROM check. The order of the LED flashes correspond to the respective IC numbers as shown below. If an IC is defective, the corresponding flash time is longer.
Examples
1. RAM OK, ROM OK
2. RAM OK, ROM(IC17) defective
3, RAM(IC21) defective, ROM OK
NOTE: ● indicates short flash time
▬ indicates long flash time
 
</td></tr>
<tr><td>2.</td><td>CP</td><td>Control panel CPU check</td><td>1.Connect the CHECKING DEVICE to CN 12 on the MAIN P.C.B. (The Checking Device switch should be off.)
2.Press and hold the two D keys shown below, and then turn on the power switch.
 
</td></tr>
<tr><td colspan="4">When the power switch is turned on, the LED of the CHECKING DEVICE flashes 4 times. The order of the LED flashes corresponds to the CPU(IC) on the respective P.C.B..s as shown below. If an IC is defective, the corresponding flash time is longer.
1. OK
2. CPU defective
NOTE: ● indicates short flash time
▬ indicates long flash time
 
</td></tr>
</table>

<table>
<tr><th>No.</th><th>PCB</th><th>TEST MODE</th><th>Procedure</th></tr>
<tr><td>3</td><td>MAIN</td><td>Wave ROM check
MAIN: IC25</td><td>Press and hold the two E keys shown below, and then turn on the power switch.
 
E keys</td></tr>
<tr><td></td><td></td><td colspan="2">When set to the self-diagnostic mode, the Wave ROM outputs a sine wave. The Wave ROMs correspond to the keyboard keys as shown in the diagram to the right. When a key is pressed, the corresponding sine wave sound is produced. If no sound is produced, or if the sound is distored, the Wave ROM corresponding to that key is defective.
The key number indicates the Wave ROM number. (1:IC25)
<table><tr><td>KEY</td><td>C</td><td>C#</td><td>D</td><td>D#</td><td>E</td><td>F</td><td>F#</td><td>G</td><td>A</td><td>A#</td><td>B</td></tr><tr><td></td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table></td></tr>
<tr><td>4</td><td>CP</td><td>LED & SW check</td><td>Press and hold the two F keys shown below, and then turn on the power switch.
 
F keys</td></tr>
<tr><td></td><td></td><td colspan="2">All the LEDs turn off after lighting once. Confirm that all the LEDs light.</td></tr>
<tr><td>5</td><td>LCD</td><td>LCD Display check</td><td>Press and hold the two G keys shown below, and then turn on the power switch.
 
G keys</td></tr>
<tr><td></td><td></td><td colspan="2">All dots of the LCD screen light for 10 seconds, after which different displays appear in succession.</td></tr>
</table>

■ Connection between serving CHECKING DEVICE and MAIN P.C.B.



SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE

The following changes in performance may occur in the Technics Keyboard but do not indicate trouble.

	Phenomenon	Remedy
Sounds and effects	The buttons, keys, etc. malfunction.	•Turn off the **PLAY** button once, then turn it on again. If this procedure is not successful, turn off this button once. Then, while pressing the three buttons to the right of the display, (**TRANSPOSE** ∧ and ∨ , and **EXIT**) at the same time, turn the **PLAY** button on again. (Note that, in this case, all programmable settings, functions and memories return to their factory-preset status.)
	No sound is produced when the keys are pressed.	•The **MAIN VOLUME** is at the minimum setting. Adjust the volume with the **MAIN VOLUME** control. •The volumes for the selected parts are set to the minimum levels. Use the balance buttons to set the volumes of the relevant parts to appropriate levels. •The part is muted. •The local control for a part performed on the keyboard is set to OFF. Set the local control to ON.
	Only percussive instrument sounds are produced when the keyboard is played.	•A sound in the **KEYBOARD PERC** sound group is selected.
	The volume is very low when the keyboard is played.	•The volume setting in the **SEQUENCER** contents is very low. Follow the INITIAL procedure to reset the settings.
	Some sounds cannot be selected.	•When the GENERAL MIDI status is set to on, the sounds which can be selected and operation which can be executed are limited. Turn the GENERAL MIDI status off to return the instrument to its normal operation.
	The sound you hear is different from the sound you selected.	•This sometimes occurs when you play back **SEQUENCER** or **COMPOSER** data which was created on a different model, or when MIDI data is received from a connected instrument. Select the desired sounds again.
Rhythm	The rhythm does not start.	•The **DRUMS** volume is set to the minimum level. Use the balance buttons to set the **DRUMS** volume to an appropriate level. •A rhythm in memory with no stored pattern was selected. Select a different rhythm. •A **SEQUENCER PLAY** button is on. when you are not playing back the **SEQUENCER** performance, turn off the **SEQUENCER PLAY** button. •Clock is set to MIDI. Set CLOCK to INTERNAL. •The rhythm does not work when the GENERAL MIDI mode is set to ON. Turn to GENERAL MIDI status off to return the instrument to its normal operation.

	Phenomenon	Remedy
AUTO PLAY CHORD	No sound is produced for the automatic accompaniment.	•A rhythm in **COMPOSER** memory with no stored pattern was selected. Select a different rhythm.
	No sound is produced for the automatic accompaniment, or only the sounds of some parts are produced.	•An **ACCOMP** part does not sound if its corresponding volume is set to the minimum level. Use the respective balance buttons to set the **ACCOMP 1, 2** and **3** volumes to appropriate levels.
SEQUENCER	Storage is not possible.	•The remaining memory capacity of the **SEQUNCER** is 0. Follow the SONG CLEAR or TRACK CLEAR procedure to erase the memory.
	Multi-track storage is not possible.	•The playback track has been selected, but the START/STOP button has not been pressed. On the recording display, the track marked with a horizontal bar in the REC row is the track which is ready for recording; a track marked with a horizontal bar in the PLAY row is a track which is ready for playback. To record one track while listening to another(playback) track, press the START/STOP button to begin playback.
	The playback measure indication is different from when the performance was recorded.	•The number of measures corresponds to the time signature of the rhythm selected at the start of recording. To change the rhythm in the middle of the song, record the rhythm change in the RHYTHM part.
COMPOSER	Storage is not possible.	•The remaining memory capacity of the **COMPOSER** is 0.
	Setting the time signature and number of measures is not possible.	•The time signature and number of measures cannot be changed for a pattern which is currently recorded in the **COMPOSER**. If you wish to change the time signature and/or measure data, first follow the procedure to clear the memory.
	The playback timing of the rhythm pattern is different from the timing with which it was recorded.	•The QUANTIZE function was on when the parttern was recorded and the timing was automatically corrected. Set the quantize level to a smaller note unit or to OFF when recording.
Disk Drive	The Disk Drive produces a noise during recording or playback.	•This occurs when the Disk Drive is reading a disk. It does not indicate a problem.
	When the procedure to load from a disk is performed, the contents of the keyboard memory are erased.	•When performing the load operation from a disk, the keyboard memory changes to that of the data loaded from the disk. If you wish to preserve a song which is stored in the keyboard memory, save it on a disk before performing the load procedure.
Other	Noise from a radio or TV can be heard.	•This sometime occurs when electrical equipment such as a radio or TV is used near the instrument. Try moving such electrical equipment further away from the instrument. •The sound may be coming from a nearby broadcast station or amteur radio station. If the sound is bothersome, consult your dealer or service center.
	The cabinet becomes warm during use.	•This instrument has a built-in power source that heats the cabinet to some degree. This is not an indication of trouble.

ERROR DISPLAY

Display		Contents
00	WRONG DISK!	The data on the disk that you are using is for a different product.
01	LOAD ERROR TRY AGAIN!	An error has occurred while the disk was loading. Please try again.
02	NO DISK!	There is no disk in the Disk Drive.
03	FILE EMPTY!	The file that you tried to load is empty.
04	SAVE ERROR TRY AGAIN!	An error has occurred while the data was being saved. Please try again.
05	WRITE PROTECTED!	The disk that you are using is write protected. Please remove the write protection and try again.
06	DISK FULL!	The disk that you are using is full. Please use another disk.
07	FORMAT ERROR TRY AGAIN!	An error has occured while the disk was formatting. The disk that you are using may be faulty. Please try formatting another disk.
08	DATA IS COPY PROTECTED!	The data on this disk is copy protected.
09	ALREADY COPY PROTECTED!	The data on this disk is already copy protected.
11	SEQUNCER DATA ERROR!	There is an error in the **SEQUENCER** data. Playback is not possible.
12	MEMORY FULL!	The memory is full. No more data can be recorded.
13	CHANGE IMPOSSIBLE!	It is not possible to change the time signature of a **COMPOSER** pattern after it has been recorded. If you want to proceed, you must first clear the entire **COMPOSER** pattern.
14	TIME SIG MISMATCH!	The time signature of the pattern from which you are copying is different from the **COMPOSER** memory that you are using. Either: Change the time signature of the **COMPOSER** memory or: Copy from a pattern that has the same time signature.
15	TIME SIG ALREADY SET	The time signature has already been set. It cannot be changed.
16	TRACK EXISTS!	The specified track already exists. It is impossible to assign two tracks to that part.
17	FILE TOO LONG!	The song is too long to be saved as an SMF file.
18	SMF LOAD ERROR!	The SMF file that you tried to load exceeds the memory capacity of this instrument and cannot be loaded. The destination **SEQUENCER** memory has been cleared.
19	BULK DUMP SEND ERROR!	An error occurred during system exclusive transmission. The data was not transmitted successfully. Please try again.
20	BULK DUMP RECV ERROR!	An error occurred during system exclusive data reception. The data was not received successfully. Please try again.
21	BULK DUMP ID CODE ERR!	The Identication (ID) code of the system exclusive data received by this instrument is for a different product.

Display		Contents
22	"ALL" OPTION ONLY AVAIL	To load data which was saved on an older model Techincs instrument, set the load option to "ALL".
23	NO SEQUENCER DATA!	There is no data in the **SEQUENCER**.
24	SMF CONVERT ERROR!	An error occurred in the SMF conversion.
25	NOT STANDARD MIDI FILE!	This disk is not in the Standard MIDI File data format.
26	SMF CONVERT ERROR!	SMF conversion is possible only for files with a time base (PPQ resolution) of 24/48/96/192/288/384.
27	SMF FORMAT ERROR!	FORMAT 2,3,4...SMF data cannot be used.
28	RHYTHM & CHORD ONLY!	Step record can be activated only for tracks to which the RHYTHM or CHORD part has been assigned.
29	SELECT A PRESET PTN!	A **COMPOSER** rhythm cannot be selected for the **SOUND ARRANGER**. Please select a preset rhythm.
30	SELECT A USER BANK!	Please select Bank "13 User Memory" to store in the **MANUAL SEQUENCE PADS**.
31	TRACK ASSIGN MISMATCH!	Special tracks such as CHORD/APC, RHYTHM and CONTROL exist in the song from which you are copying and are incompatible with the destination song because it is in the GM mode.
32	MEAS/T.SIG MISMATCH!	The **COMPOSER** pattern you have chosen has a different time signature or number of measures from the other patterns in this **COMPOSER CHORD MAP**. All of the **COMPOSER** patterns used in a **COMPOSER CHORD MAP** must have the same time singnature and number of measures.
33	NOT ENOUGH AVAIL MEMORY	The song that you have tried to load exceeds the this instrument's available memory and cannot be loaded. The selected **SEQUENCER** song memory has been cleared. Please clear existing songs in the instrument's memory using SONG CLEAR to make more memory available, and try again.
34	THIS FILE IS SMF FORMAT!	This is an SMF FORMAT 1 file. Direct Play and Sequncer Medley are not available for this file.
35	RHYTHM DATA ERROR!	There is an error in the rhythm data. Playback is not possible.
36	MSP DATA ERROR!	There is an error in the **MANUAL SEQUENCER PADS** data. Playback is not possible.
	WARNING! LOW BATTERIES!	The remaining battery power is very low. Replace all the batteries with new ones immediately.

PRECAUTIONS BEFORE SERVICING

■ Precautions for measuring of the output waveforms.

1. The waveform was measured with a "National Digital Storage Oscilloscope YP-5730A". Therefore the waveforms of musical tone signals shown may differ somewhat due to the difference in the timing of triggering.
2. Since the 1/10 test probe is used, the indicated voltage value on the bottom part of each waveform photo is 1/10 of the actual value (e.g. 0.2 V/cm should be 2.0 V/cm).
3. To measure the waveforms, first set this unit to the self-diagnostic mode (refer to page I -12, No.3). The Wave ROM output will then be output as a sine wave to facilitate the servicing check.

■ Important safety notice:

Components identified by a ⚠ mark have special characteristics impotant for safety.
When replacing any of these components, use only manufacture's specified parts.

■ Symbolic Marks

The symbolic marks for resistors and capacitors which used in this circuits are classified as following TABLE-1 and TABLE-2.

1. RESISTORS
   - •Resistors without symbolic mark are FIXED CARBON FILM RESISTORS(ERD-type).
   - •All resistors are 1/4WATT, ± 5%TOLERANCE unless otherwise designated in schematic diagrams.

(TABLE-1)

SYMBOL	SPECIFICATION	SYMBOL	SPECIFICATION
Ⓕ	Fixed Carbon Film Resistors "FLAME-PROOF"(ERD—F—type)	Ⓕ	Fixed Metal Film Resistors "FLAME-PROOF"(ERX—type)
Ⓕ	Fixed Wire Wound Resistors "FLAME-PROOF"(ERF—type)	[F]	Fuse Type Fixed Metal Oxide Film Resistors "FLAME-PROOF"(ERQ—type)
Ⓕ	Fixed Metal Oxide Film Resistors "FLAME-PROOF"(ERG—type)	[F]	Fuse Type Fixed Carbon Film Resistors "FLAME-PROOF"(ERD2FC—type)
Ⓖ	Fixed Metal Film Resistors (Precision and High Stability) (ERO—type)		

2. CAPACITORS
   - •Capacitors without symbolic mark are POLYESTER CAPACITORS. (ECQM-type, ECQG-type, ± 10%Tolerance)
   - •Polarized capacitors without symbolic mark are Aluminum Electrolytic Capapcitors. (ECEA-type, ± 20%Tolerance)

(TABLE-2)

SYMBOL	SPECIFICATION	SPECIFICATION
Ⓝ	Non-Polarized Electrolytic Capacitors	ECEA_KN_type
Ⓨ	Non-Polarized Electrolytic(for Network system)	ECEA_Y_type
Ⓣ	Tantalum Solid Electrolytic Capacitors	ECS_type
TF	Metalized Plastic Film Capacitors(TF Series)	ECQV_type
○	Temperature Compensating Ceramic Capacitors	ECC_type
	High-Dielectric Constant Ceramic Capacitors	ECK_type ECR_type
	Axial Lead Ceramic Capacitors	ECB_type
	Metalized Polyester Film Capacitors for Across the Line	ECQ_EW_type
	Aluminum Electrolytic Capacitors for Smoothing Circuit	ECES_type
	Multilayer Ceramic Chip Capacitors	ECUV_type

MIDI IMPLEMENTATION CHART

Keyboard **(Transmitted)**

Function		RIGHT1,2,LEFT, PART4~15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks
Basic	Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized
Channel	Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	
	Default	3	3	3	3	3	3	3	3	OMNI OFF, POLY MODE
Mode	Messages	×	×	×	×	×	×	×	×	
	Altered	–	–	–	–	–	–	–	–	
Note		0-119	0-119	0-119	0-119	0-119	0-119	0-119	–	Changes depending on the position of the transpose control, octave shift, and drums type.
Number	True voice	–	–	–	–	–	–	–	–	
Velocity	Note ON	○	○	○	○	○	○	○	–	
	Note OFF	×	×	×	×	×	×	×	–	
After	Key's	×	×	×	×	×	×	×	–	
Touch	Ch's	○× *	×	×	×	×	×	×	–	
Pitch Bend		○× *	×	○× *	○× *	○× *	×	○× *	×	
Control Change	0,32	○× *	○× *	○× *	○× *	○× *	○× *	○× *	×	bank select MSB, LSB
	1	○× *	×	○× *	○× *	○× *	×	○× *	×	modulation
	6,38	○× *	×	×	×	×	×	×	×	data entry MSB, LSB
	7	○× *	○× *	○× *	○× *	○× *	○× *	○× *	×	volume
	10	○× *	×	○× *	○× *	○× *	×	×	×	panpot
	11	○× *	○× *	○× *	○× *	○× *	○× *	×	○× *	expression
	64	○× *	×	○× *	○× *	○× *	×	×	×	sustain
	80	×	×	○× *	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	○× *	×	×	intro, fill in, ending
	91	○× *	○× *	○× *	○× *	○× *	○× *	○× *	○× *	reverb
	93	○× *	○× *	×	×	×	×	×	×	DSP effect/Chorus
	94	○× *	×	○× *	○× *	○× *	×	○× *	×	digital effect
	100,101	○× *	×	×	×	×	×	×	×	RPN LSB, MSB
	120	○	○	×	×	×	×	×	×	all sound off
	121	○× *	○× *	×	×	×	×	×	×	reset all controllers
Prog Change		○× *	○× *	○× *	○× *	○× *	○× *	○× *	×	Changes depending on program change mode and prog.cng to p.mem.
	True#	–	–	–	–	–	–	–	–	
System exclusive		○								
System common	Song Pos	○× *								
	Song Sel	○× *(0-19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	○× *								start/stop,continue
Aux Messages	Local ON/OFF	×	×	×	×	×	×	×	–	
	All notes OFF	×	×	×	×	×	×	×	–	
	Active Sense	○								
	Reset	×								
Notes		○× *••••••••••••Whether or not the data for each these items is transmitted can be set.								

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO ○ : Yes

Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO × : No

Keyboard

(Recognized)

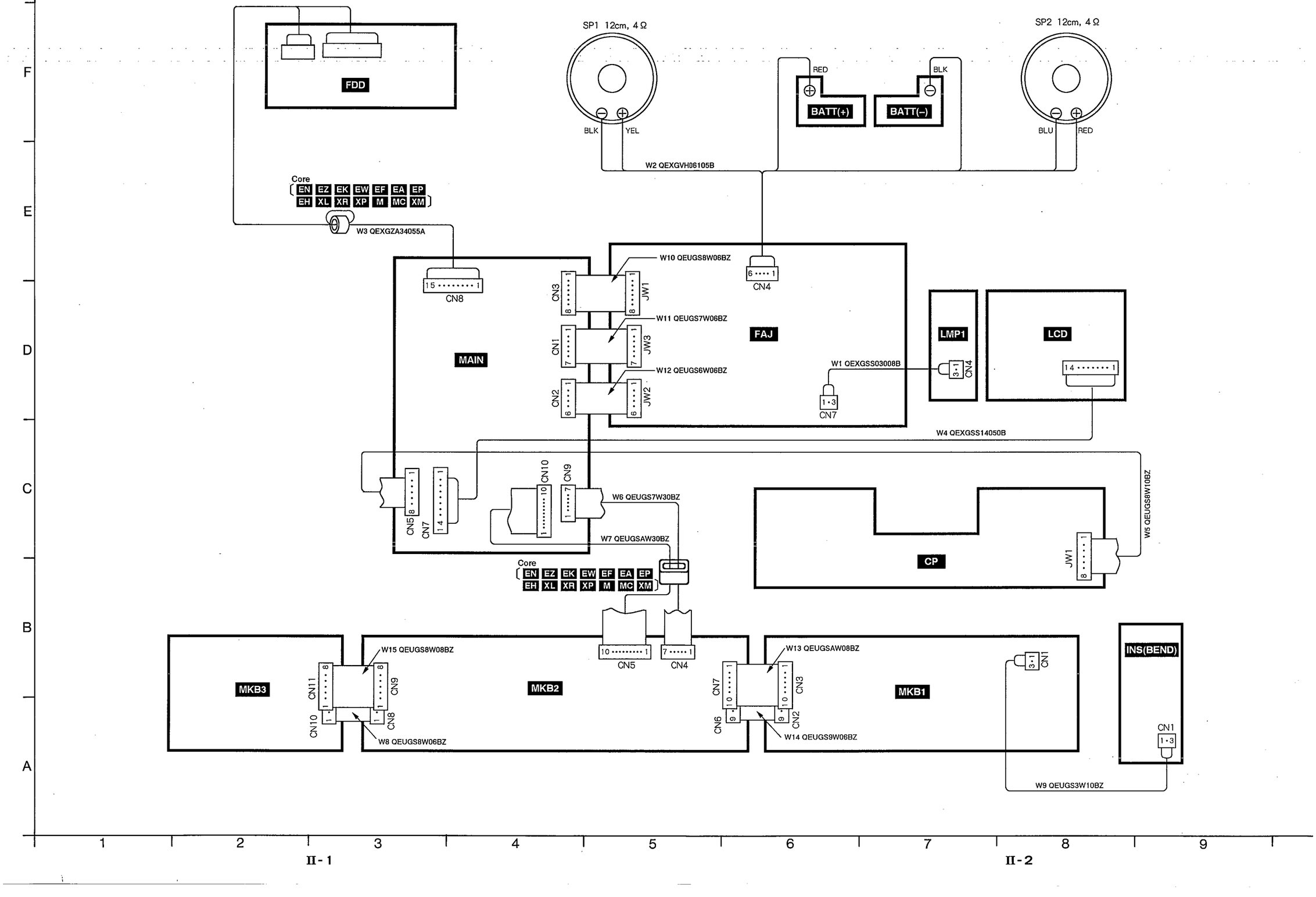
Function		RIGHT1,2,LEFT, PART4~15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks
Basic	Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized
Channel	Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	
	Default	3	3	3	3	3	3	3	3	OMNI OFF, POLY MODE
Mode	Messages	×	×	×	×	×	×	×	×	
	Altered	–	–	–	–	–	–	–	–	
Note		0-127	0-127	0-127	0-127	0-127	0-127	0-127	–	Changes depending on the position of the transpose control, octave shift, and drums type.
Number	True voice	0-127	0-127	0-127	0-127	0-127	0-127	0-127	–	
Velocity	Note ON	○	○	○	○	○	○	○	–	
	Note OFF	×	×	×	×	×	×	×	–	
After	Key's	×	×	×	×	×	×	×	–	
Touch	Ch's	○×*	×	×	×	×	×	×	–	
Pitch Bend		○×*	×	○×*	○×*	○×*	×	○×*	×	
Control Change	0,32	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	bank select MSB, LSB
	1	○×*	×	○×*	○×*	○×*	×	○×*	×	modulation
	6,38	○×*	×	×	×	×	×	×	×	data entry MSB, LSB
	7	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	volume
	10	○×*	×	○×*	○×*	○×*	×	×	×	panpot
	11	○×*	○×*	○×*	○×*	○×*	○×*	×	○×*	expression
	64	○×*	×	○×*	○×*	○×*	×	×	×	sustain
	80	×	×	○×*	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	○×*	×	×	intro, fill in, ending
	91	○×*	○×*	○×*	○×*	○×*	○×*	○×*	○×*	reverb
	93	○×*	○×*	×	×	×	×	×	×	DSP effect/Chorus
	94	○×*	×	○×*	○×*	○×*	×	○×*	×	digital effect
	100,101	○×*	×	×	×	×	×	×	×	RPN LSB, MSB
	120	○	○	○	○	○	○	○	×	all sound off
	121	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	reset all controllers
Prog Change	True#	○×* 0-127	○×* 0-127	○×* 0-127	○×* 0-127	○×* 0-127	○×* 0-127	○×* 0-127	× –	Changes depending on program change mode and prog.cng to p.mem.
System exclusive		○								
System common	Song Pos	○×*								
	Song Sel	○×*(0-19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	○×*								start/stop,continue
Aux Messages	Local ON/OFF	×	×	×	×	×	×	×	–	
	All notes OFF	○	○	○	○	○	○	○	–	
	Active Sense	○								
	Reset	×								
Notes		○×*••••••••••••Whether or not the data for each these items is transmitted can be set.								

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO ○ : Yes

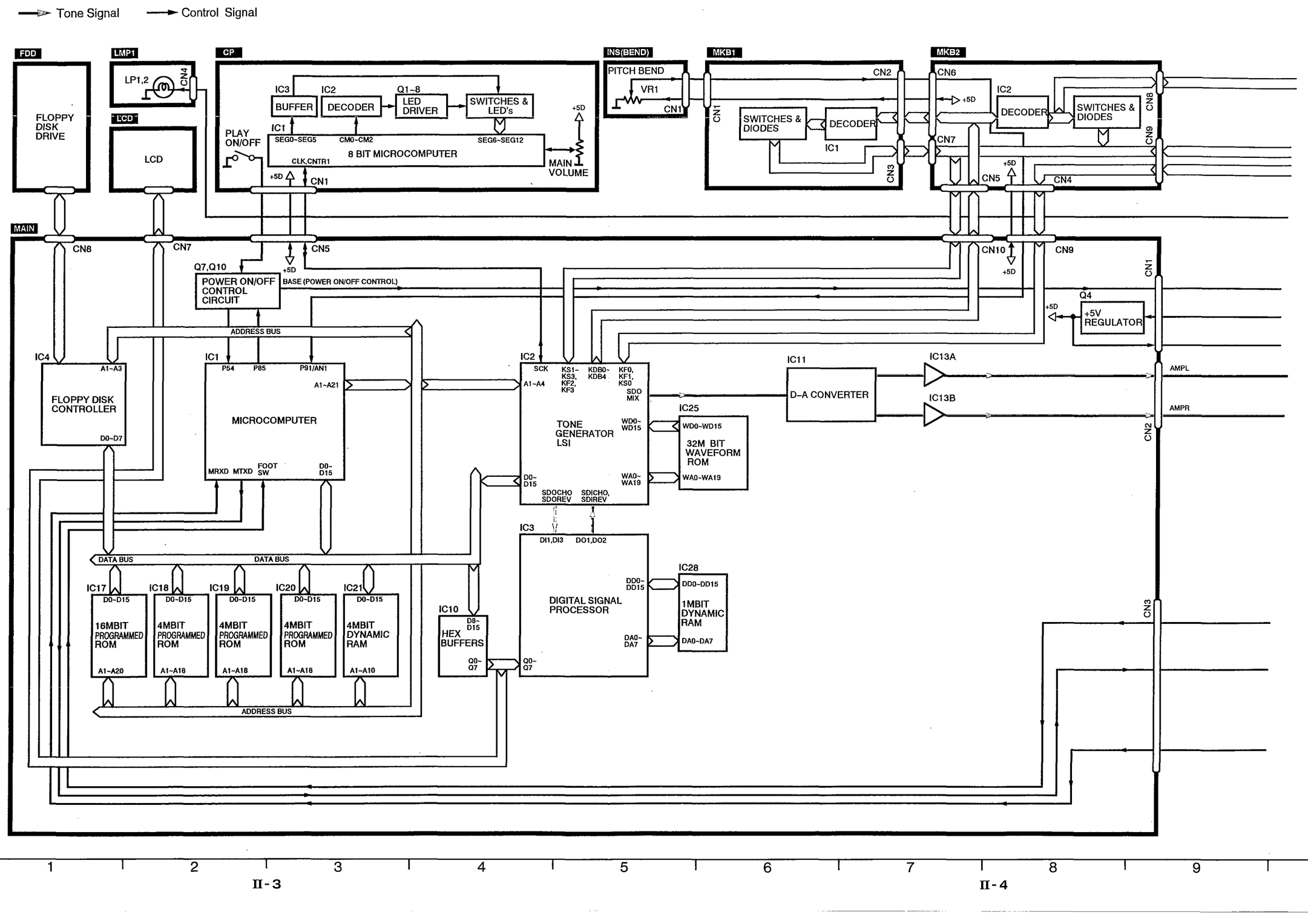
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO × : No

MEMO

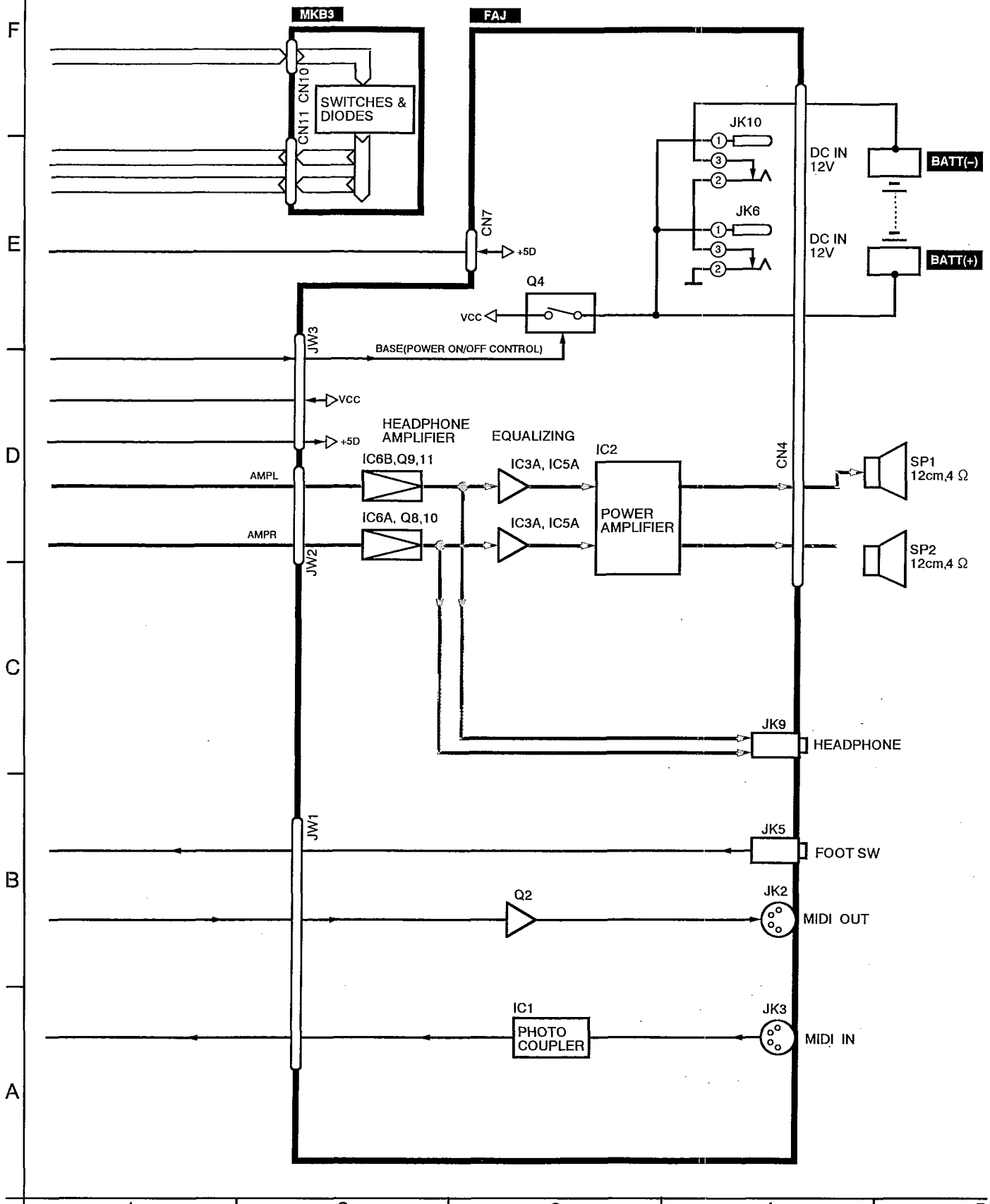
WIRING CONNECTION Diagram



BLOCK (A) Diagram



BLOCK (B) Diagram



WAVEFORM OF MAIN

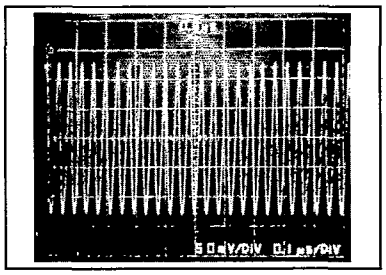
■ Measuring Conditions

Check Point ❺

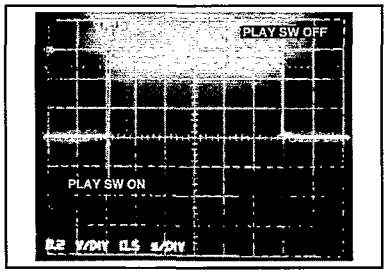
Set to the self-diagnostic mode followings.

- While pressing E3 and E4 keys simultaneously, turn on the PLAY switch.
- Number pad..... NO. 5 (SIN WAVE 10dB DOWN)
- Key C3
- Main Volume ..... MAX

❶

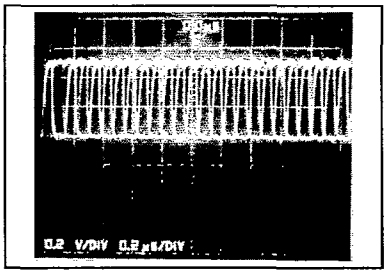


❷ 5MI

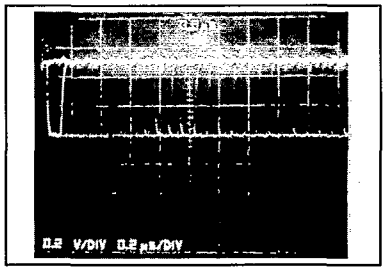


- PLAY SW..... ON → OFF

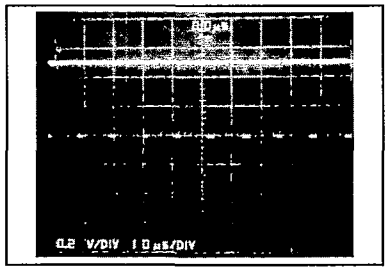
❸ $\overline{RD}$



❹ $\overline{WR}$



❺



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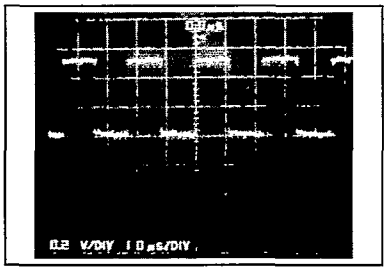
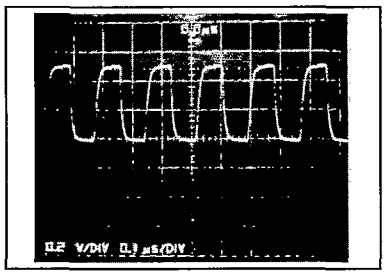
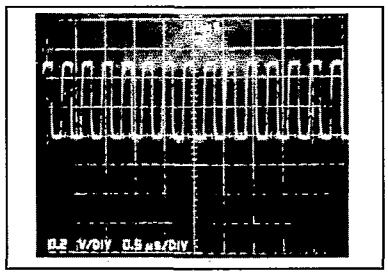


❼



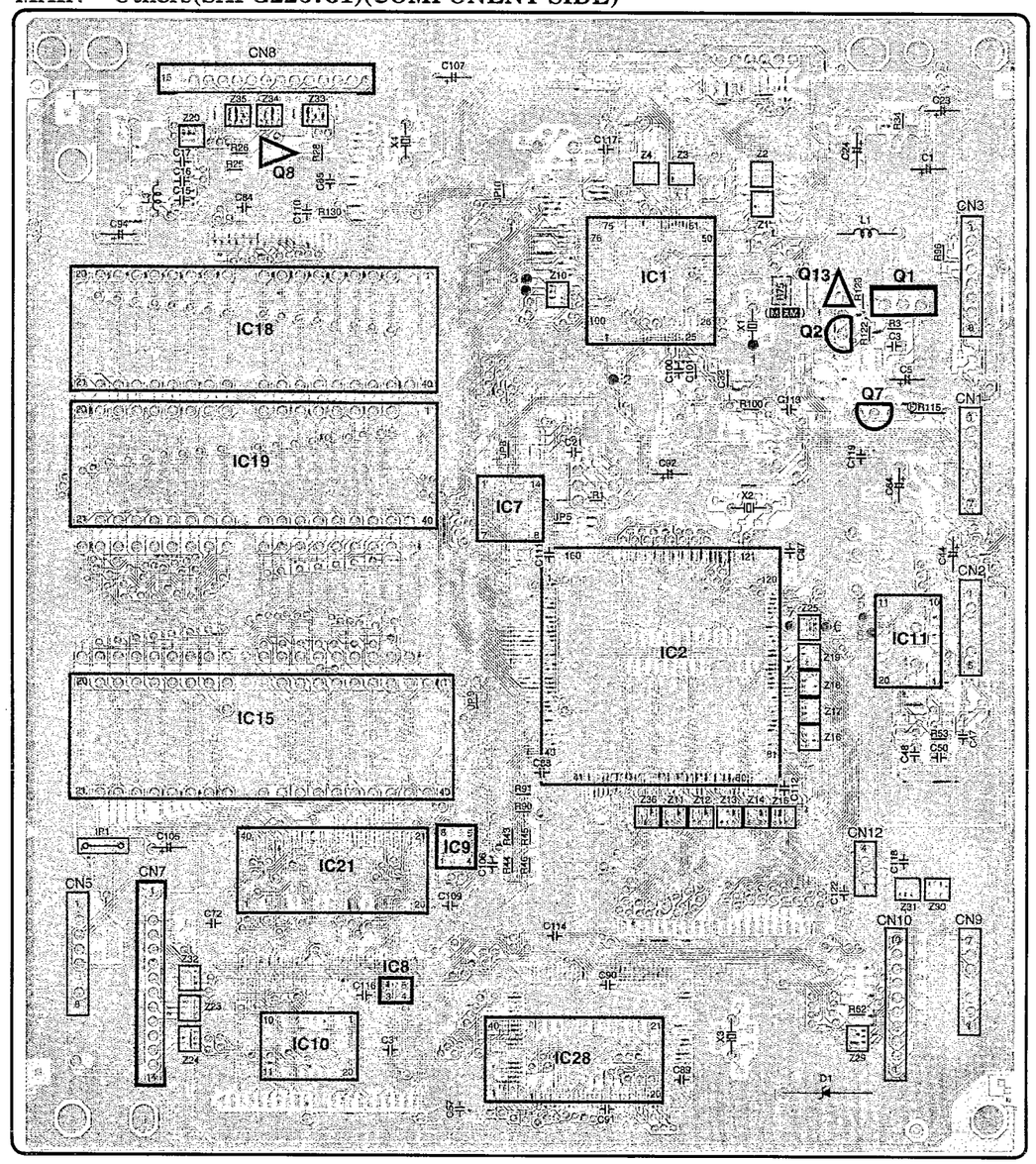
❽



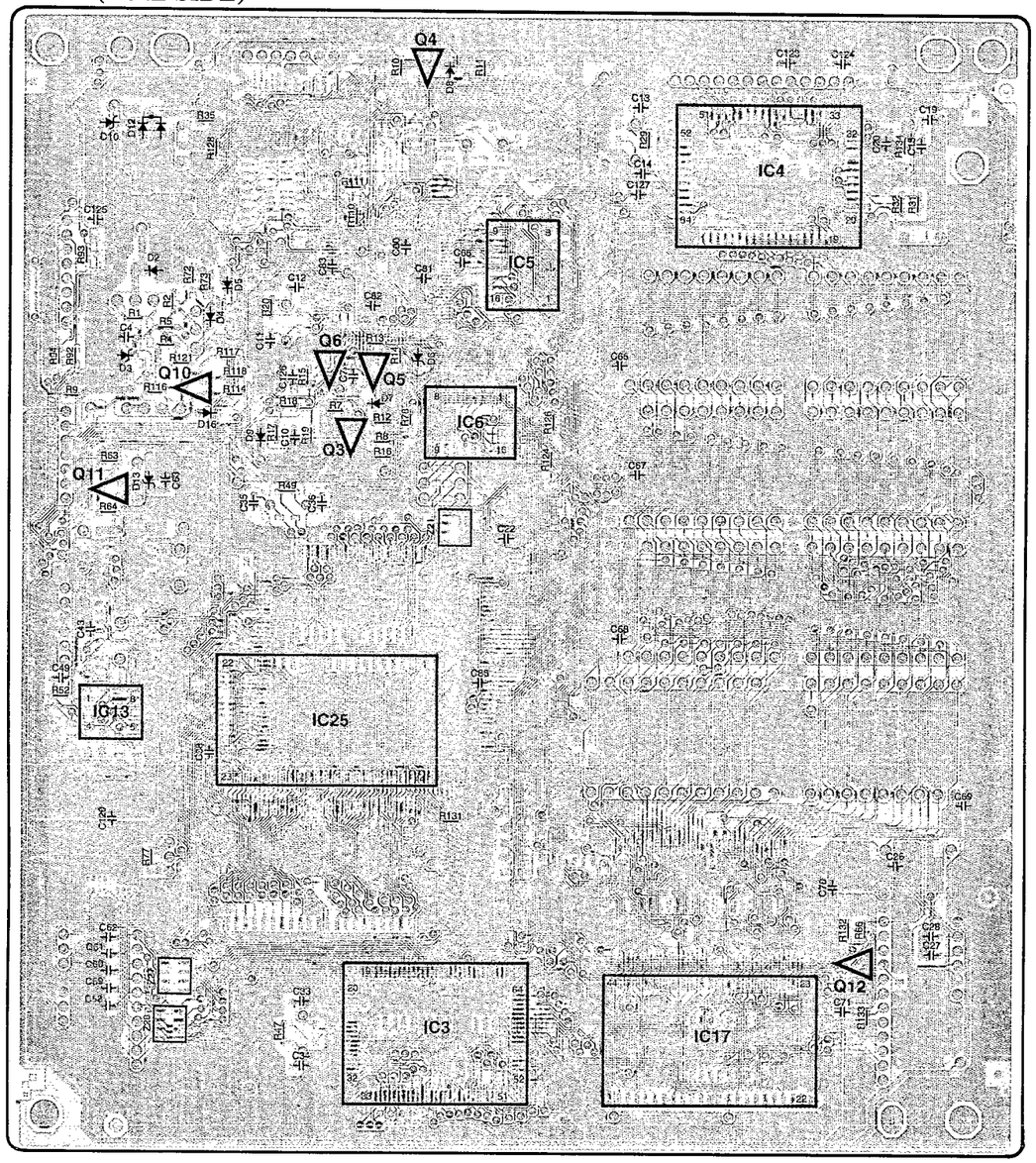
MAIN P.C. Board

M XM (SXPG226741)

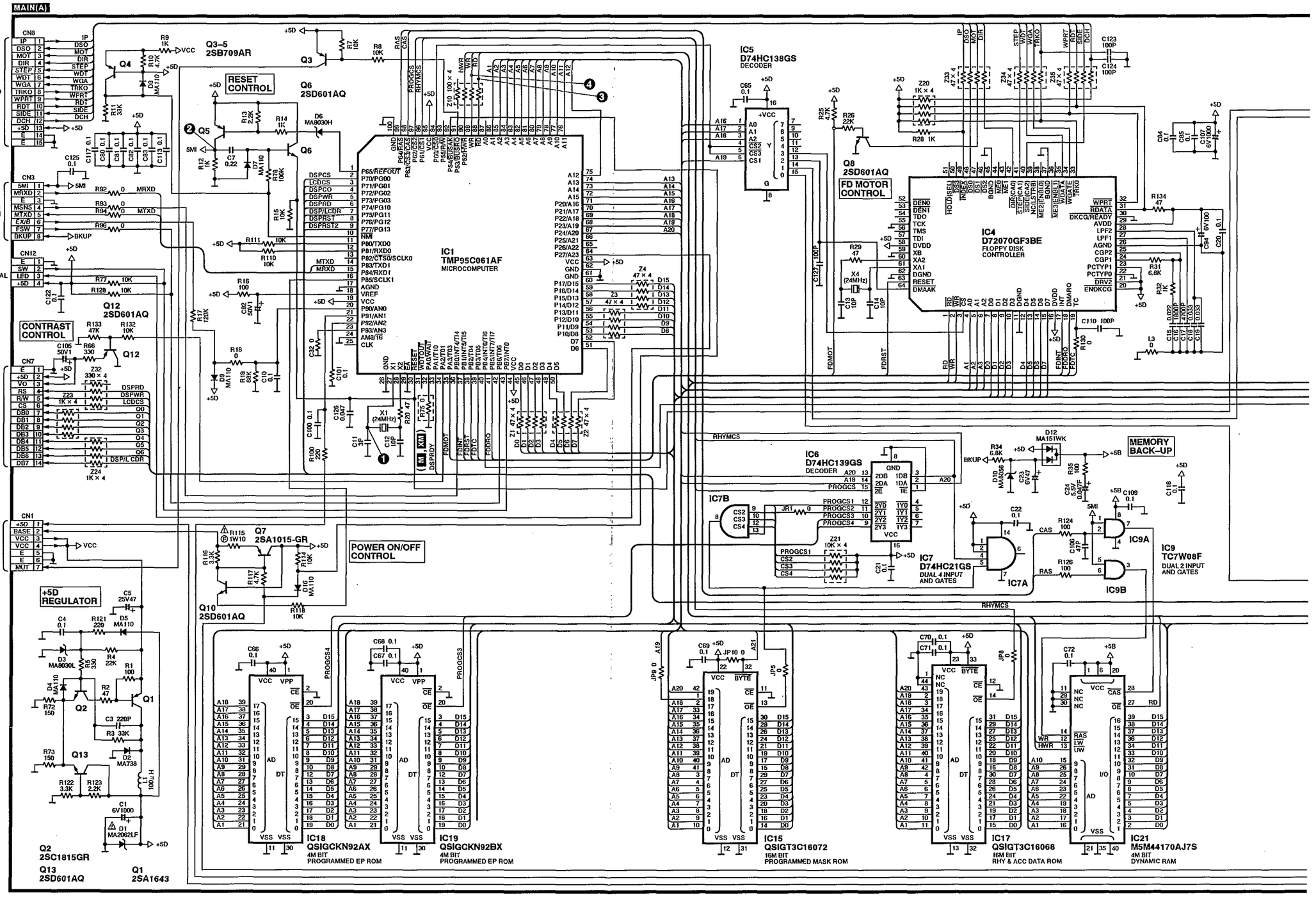
MAIN Others(SXPG226731)(COMPONENT SIDE)



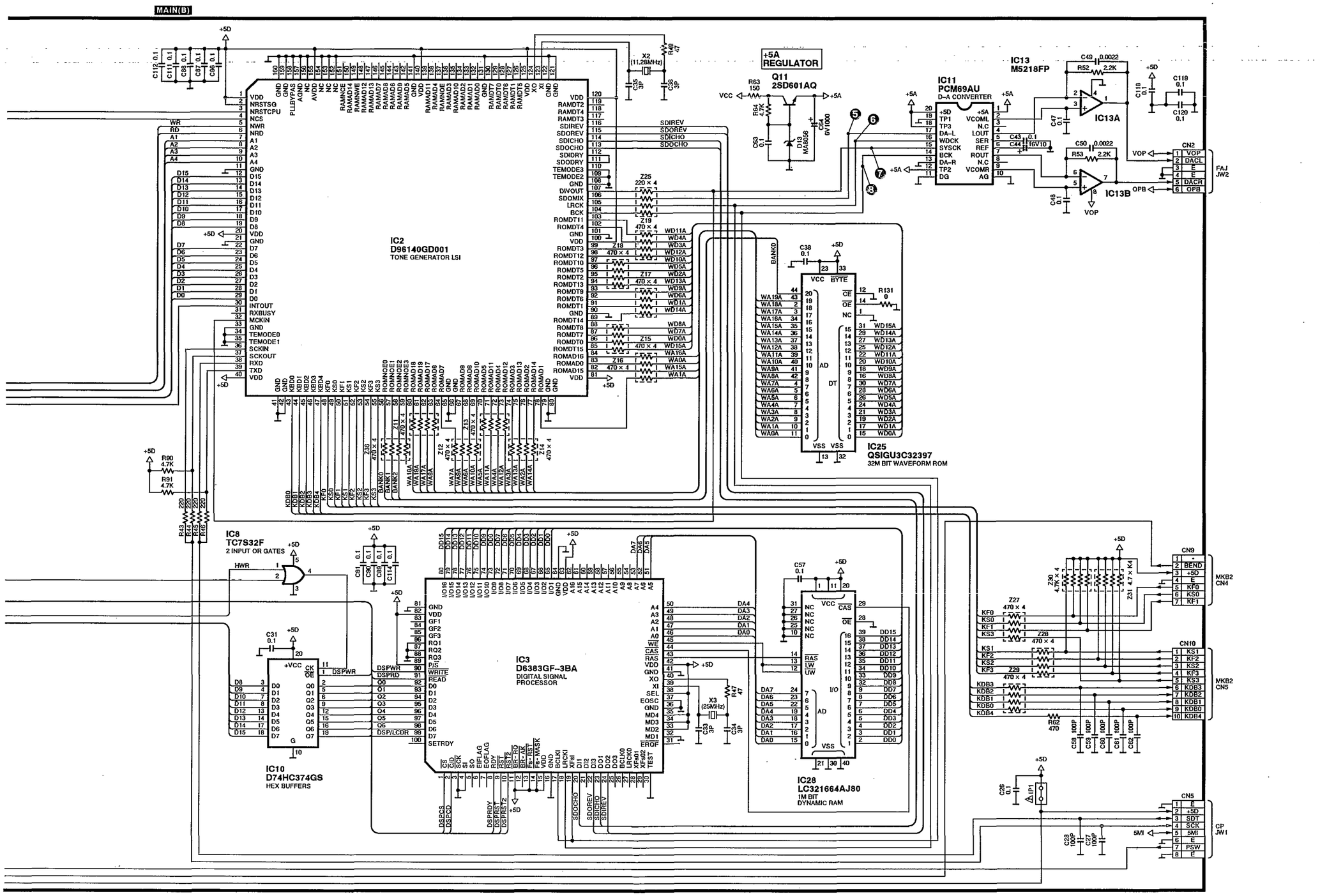
MAIN (FOIL SIDE)



MAIN (A) P.C. Diagram



MAIN (B) P.C. Diagram



FAJ/LAMP 1/BATT +/− P.C. Board

WAVEFORM OF FAJ

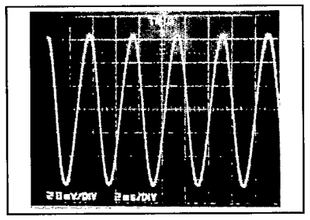
■ Measuring Conditions

Check Point ❶, ❷, +L OUT, −L OUT, +R OUT, −R OUT

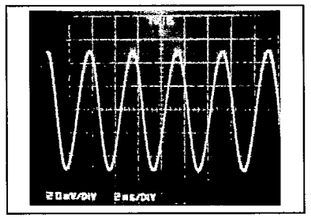
Set to the self-diagnostic mode followings.

- While pressing E3 and E4 keys simultaneously, turn on the PLAY switch.
- Number pad..... NO. 5 (SIN WAVE 10dB DOWN)
- Key C3
- Main Volume ..... MAX

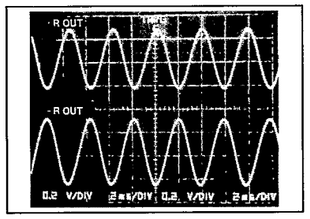
❶



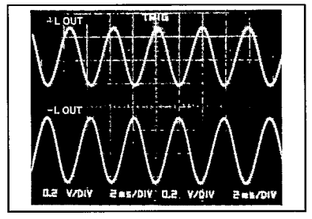
❷



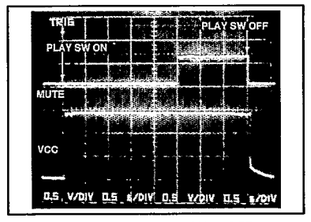
+R OUT, −R OUT



+L OUT, −L OUT

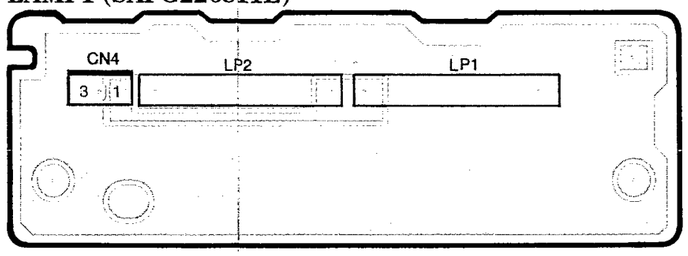


MUTE, VCC

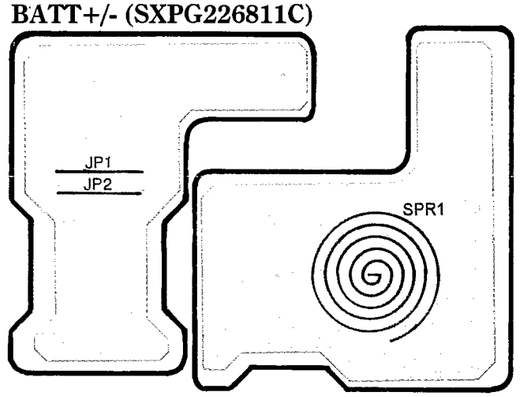


● PLAY SW..... ON ↔ OFF

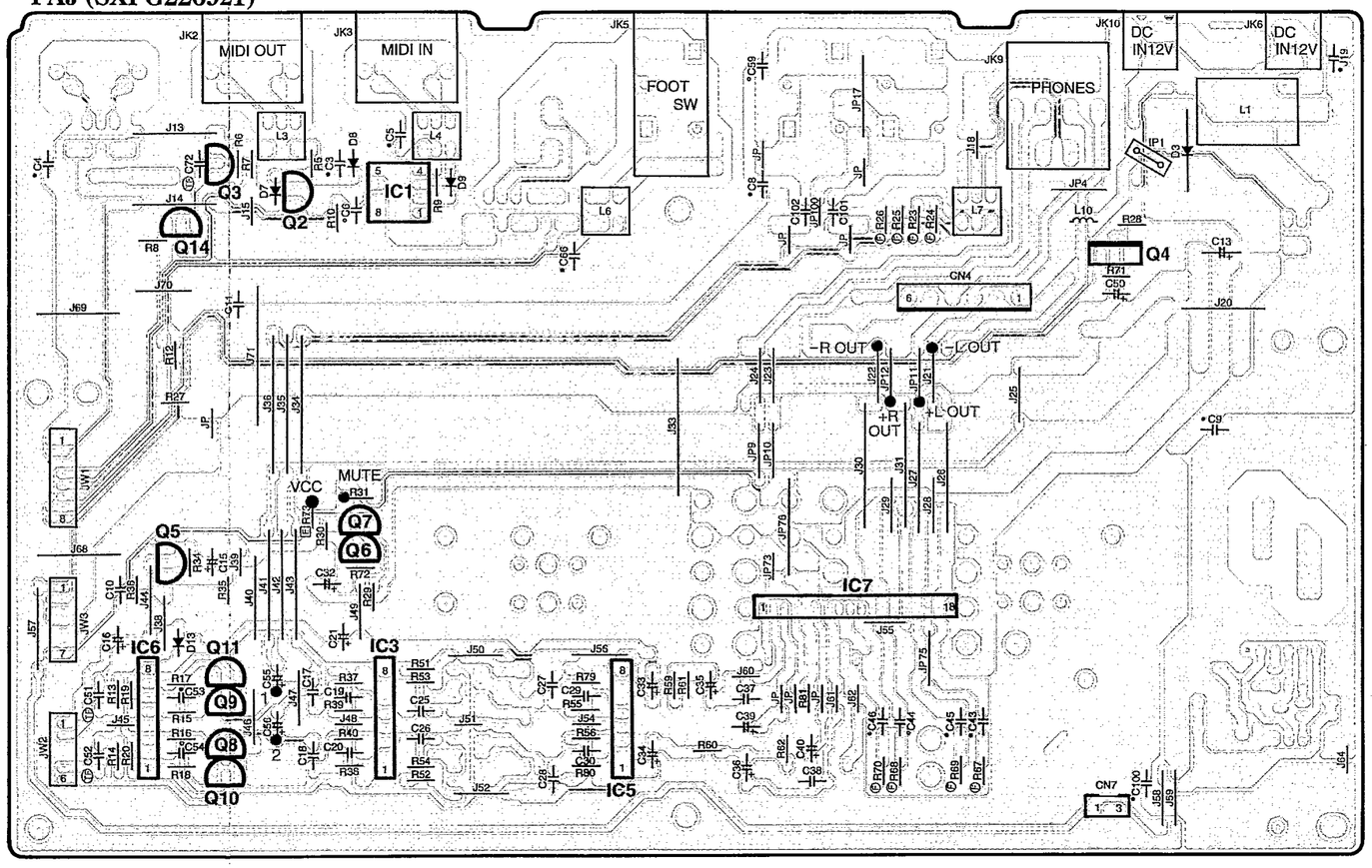
LAMP1 (SXPG226811E)



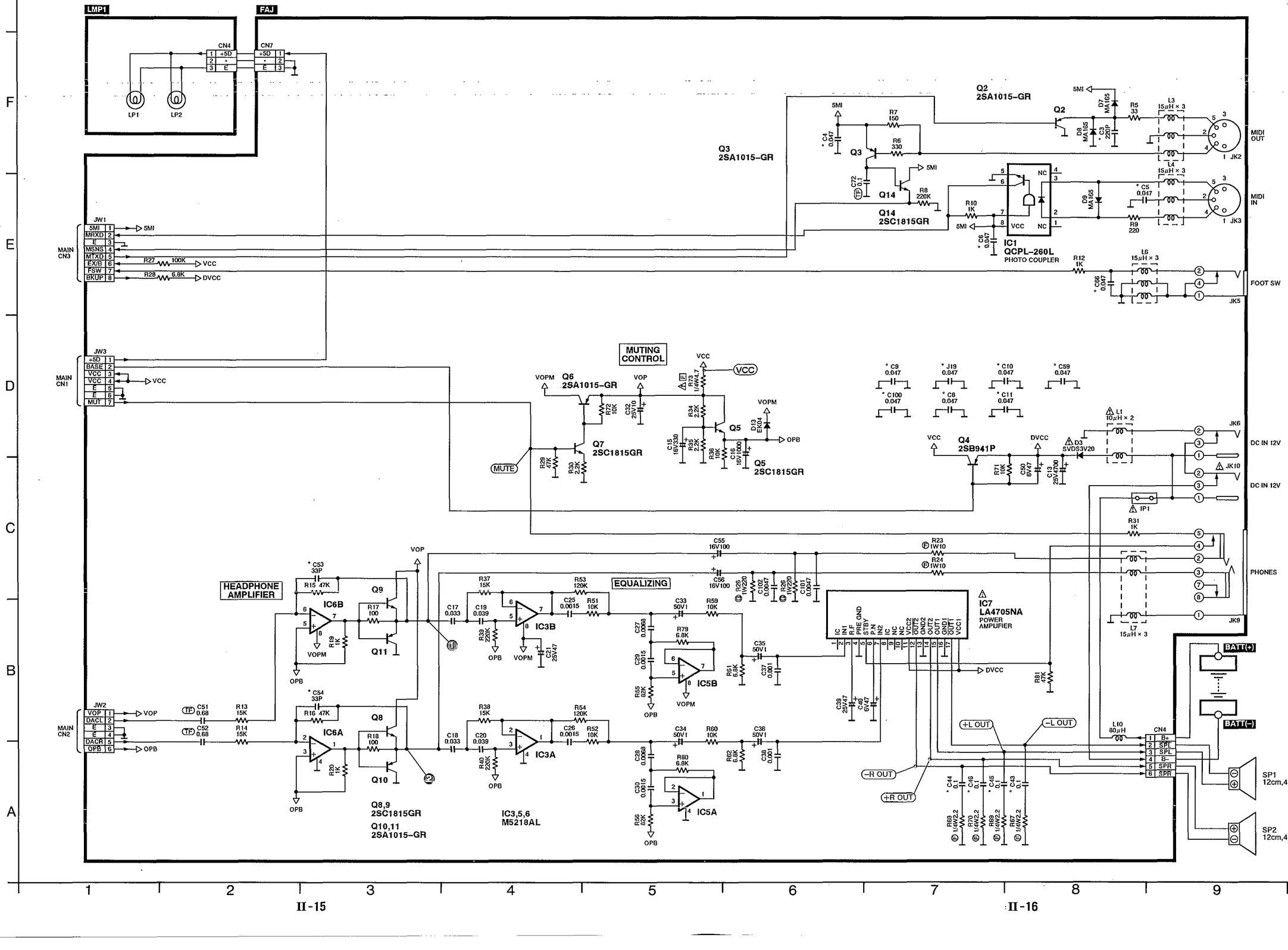
BATT+/- (SXPG226811C)



FAJ (SXPG226921)

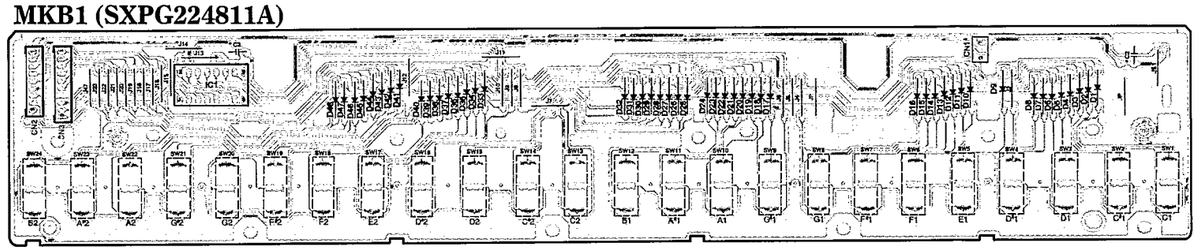


FAJ/LAMP 1/BATT +/– P.C. Diagram

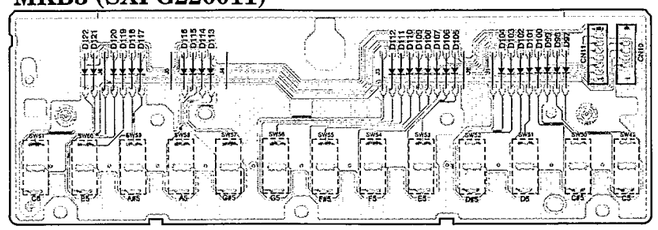


CP/MKB1/2/3/INS (BEND) P.C. Board

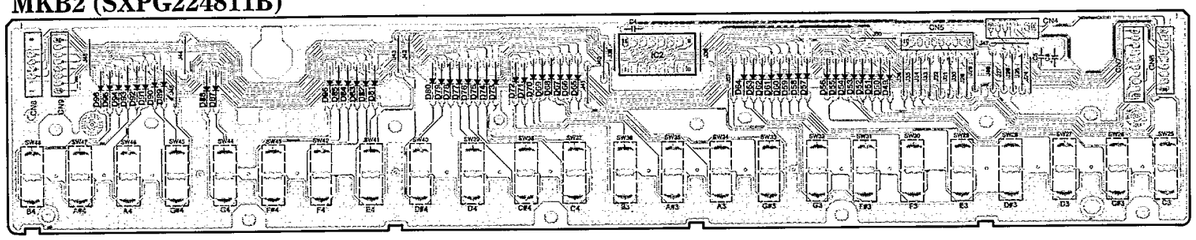
MKB1 (SXPG224811A)



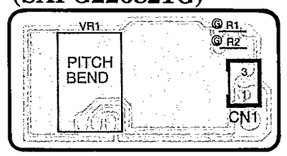
MKB3 (SXPG220011)



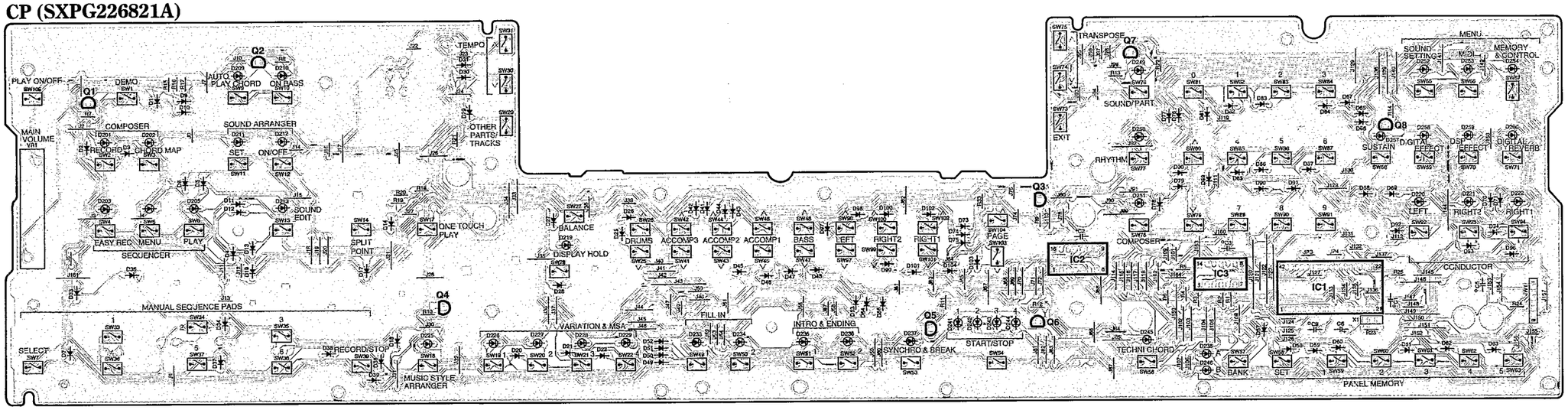
MKB2 (SXPG224811B)



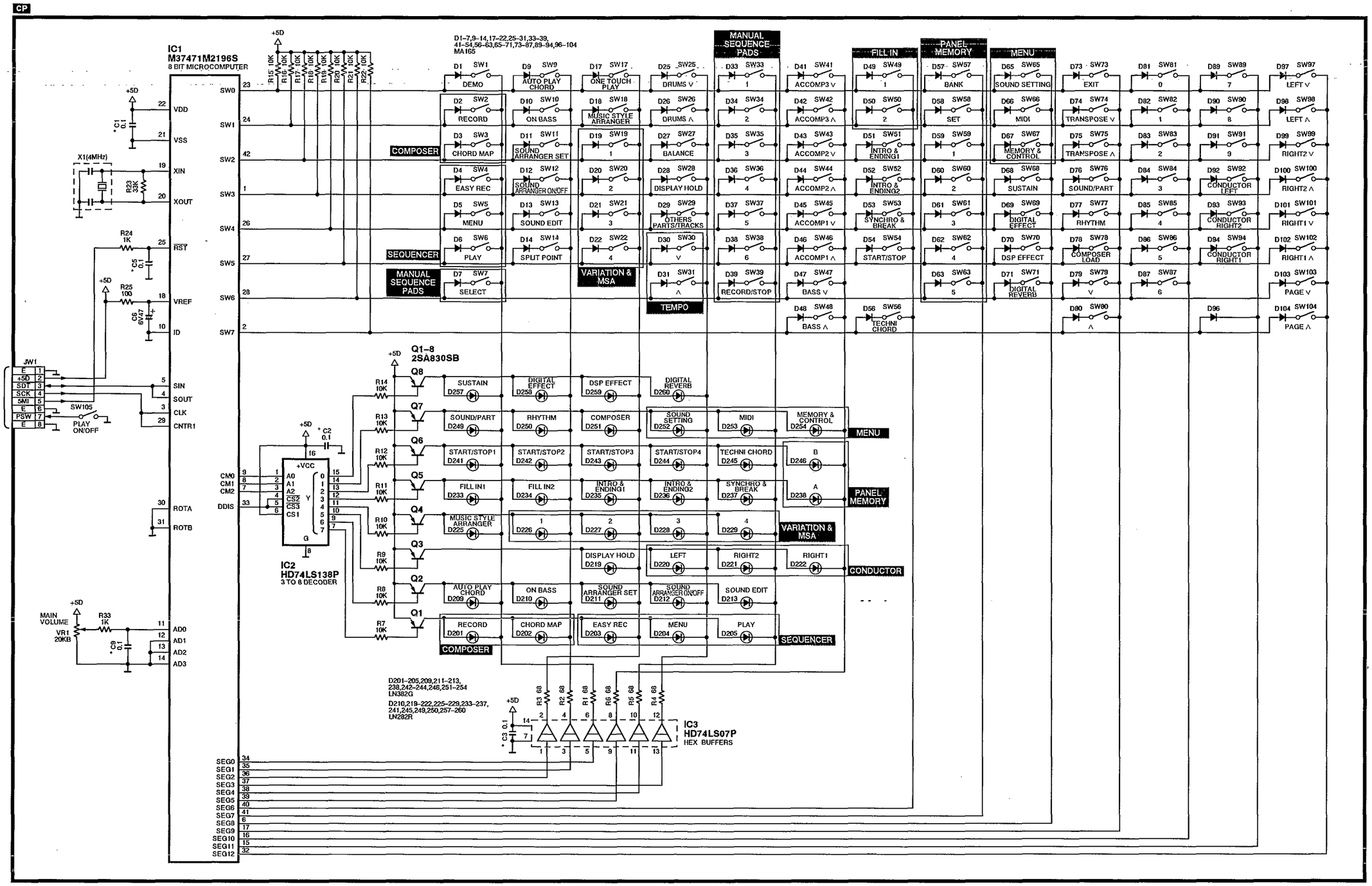
INS(BEND) (SXPG226821G)



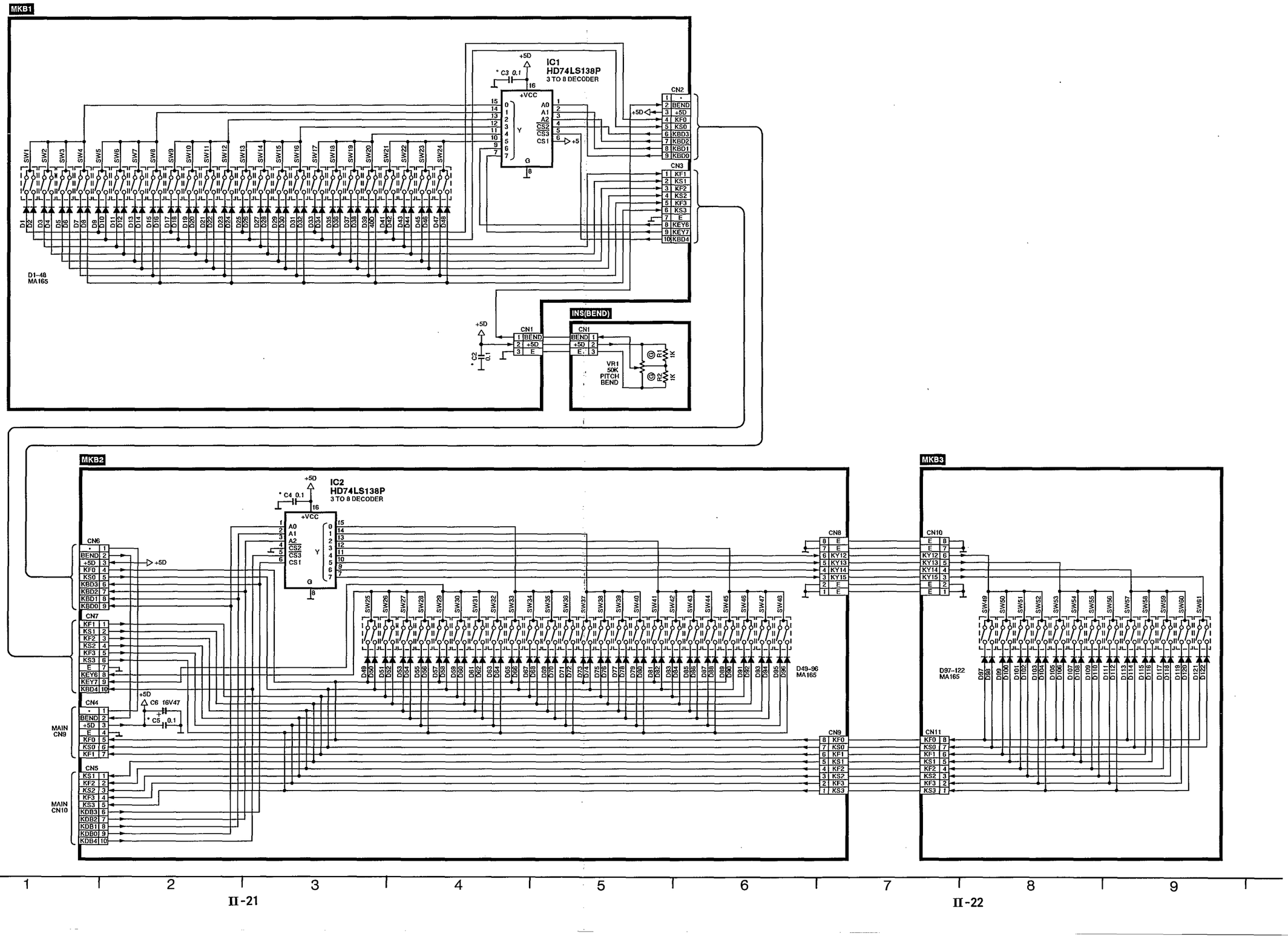
CP (SXPG226821A)



CP P.C. Diagram



MKB1/2/3/INS (BEND) P.C. Diagram



REPLACEMENT PARTS LIST

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "S" mark is service standard parts and may differ from production parts.
4. ○ mark are new parts.
5. For part No. with area mark, check the area when placing an order.

■PRINTED CIRCUIT BOARD

	RTL	Area	Part No.	Description	P/S
○	RTL	EN MC EZ EK EW EF EA EP EH X XL XR XS XD XT XP	SXPG226731	MAIN	1
○	RTL	M XM	SXPG226741	MAIN	1
○	RTL		SXPG226821A	CP	1
○	RTL		SXPG226921	FAJ	1
○	RTL		SXPG226811E	LAMP1	1
○	RTL		SXPG226811C	BATT+/−	1
S	RTL		SXPG224811A	MKB1	1
	RTL		SXPG224811B	MKB2	1
	RTL		SXPG220011	MKB3	1
○	RTL		SXPG226821G	INS (BEND)	1
○	RTL		QSLG021AA	LCD	1

MAIN MAIN CIRCUIT

	Ref. No.	Part No.	Description	P/S
	INTEGRATED CIRCUITS			
	IC1	TMP95C061AF	IC, 16 BIT MICROCONTROLLER	1
	IC2	D96140GD001	IC, 16 BIT MICROCONTROLLER	1
	IC3	D6383GF-3BA	IC, MICROCONTROLER, 16 BIT	1
	IC4	D72070GF3BE	IC, 8 BIT MICROCONTROLLER	1
	IC5	D74HC138GS	IC, CMOS LOGIC	1
	IC6	D74HC139GS	IC, CMOS LOGIC	1
	IC7	D74HC21GS	IC, CMOS LOGIC	1
	IC8	TC7S32F	2 INPUT OR GATE	1
	IC9	TC7W08F	DUAL 2-INPUT AND GATES	1
	IC10	D74HC374GS	IC, CMOS LOGIC	1
	IC11	PCM69AU	D-A CONVERTER	1
	IC13	M5218AFP	OPERATIONAL AMPLIFIER	1
○	IC15	QSIGT3C16072	IC, 16M MASK ROM	1
○	IC17	QSIGT3C16068	IC, 16M MASK ROM	1
○	IC18	QSIGCKN92AX	IC, 4M EP ROM	1
	IC18-1	HN27C4096G10	(BLANK ROM)	1
○	IC19	QSIGCKN92BX	IC, 4M EP ROM	1
	IC19-1	HN27C4096G10	(BLANK ROM)	1
	IC21	M5M44170AJ7S	IC, D RAM 4M BIT	1
○	IC25	QSIGU3C32397	IC, 32M MASK ROM	1
	IC28	LC321664AJ80	1M BIT DYNAMIC RAM	1
	TRANSISTORS			
	Q1	2SA1643	TRANSISTOR	1
S	Q2	2SC1815GR	TRANSISTOR	1
	Q3~5	2SB709AR	TRANSISTOR	3
	Q6	2SD601AQ	TRANSISTOR	1
S	Q7	2SA1015-GR	2SA933STRS (SUB. PART)	1
	Q8, 10~13	2SD601AQ	TRANSISTOR	5
	DIODES			
	D1 ⚠	MA2062LF	ZENER, 6.2V	1
	D2	MA738	DIODE	1
	D3	MA8030L	ZENER, 2.9V	1
	D4, 5	MA110	DIODE	2
○	D6	MA8030H	DIODE, SI, 3.1V	1
	D7~9	MA110	DIODE	3
	D10	MA8056	ZENER, 5.6V	1
	D12	MA151WK	DIODE	1
	D13	MA8056	ZENER, 5.6V	1
	D16	MA110	DIODE	1
	OSCILLATORS			
	X1	QSXG2F2400A	CERAMIC OSCILLATOR	1
	X2	QSXG1A1128A	CRYSTAL OSCILLATOR	1
	X3	QSXG2F2500A	25MHz CERAMIC OSCILLATOR	1
	X4	QSXG2F2400A	CERAMIC OSCILLATOR	1
	COMPONENT COMBINATIONS			
	Z1~4	EXBV8V470J	RESISTOR RESISTOR	4
	Z10	EXBV8V101J	100Ω×4	1
	Z11~19	EXBV8V471J	470Ω×4	9
	Z20	EXBV8V102J	1KΩ×4	1
	Z21	EXBS8V103J	10KΩ×4	1
	Z23, 24	EXBV8V102J	1KΩ×4	2
	Z25	EXBV8V221J	220Ω×4	1
	Z27, 28	EXBS8V471J	470Ω×4	2
	Z29	EXBV8V471J	470Ω×4	1
	Z30, 31	EXBV8V472J	4.7KΩ×4	2
	Z32	EXBV8V331J	RESISTOR RESISTOR	1
	Z33~35	EXBV8V470J	RESISTOR RESISTOR	3
	Z36	EXBV8V471J	470Ω×4	1
	COIL			
	L1	QLCGTJR10KA	100μF	1
	IC PROTECTOR			
	IP1 ⚠	ICP-N10T104	IC PROTECTOR	1
	RESISTORS			
	C32, 101	ERJ6GEY0R00V	0Ω	2
	JP5, 8~10	ERJ6GEY0R00V	0Ω	4
	JR1	ERD25V0R00	CARBON FILM RESISTOR	1
	L3	ERD25V0R00	CARBON FILM RESISTOR	1
	R1	ERJ6GEYJ101V	100Ω	1

Ref. No.	Part No.	Description	P/S
R2	ERJ6GEYJ470V	47Ω	1
R3	ERJ6GEYJ333V	33KΩ	1
R4	ERJ6GEYJ223V	22KΩ	1
R5	ERJ6GEYJ331V	330Ω	1
R7, 8	ERJ6GEYJ103V	10KΩ	2
R9	ERJ6GEYJ102V	1KΩ	1
R10	ERJ6GEYJ472V	4.7KΩ	1
R11	ERJ6GEYJ333V	33KΩ	1
R12	ERJ6GEYJ102V	1KΩ	1
R13	ERJ6GEYJ222V	2.2KΩ	1
R14	ERJ6GEYJ102V	1KΩ	1
R15	ERJ6GEYJ103V	10KΩ	1
R16	ERJ6GEYJ101V	100Ω	1
R17	ERJ6GEYJ124V	120KΩ	1
R18	ERJ6GEY0R00V	0Ω	1
R19	ERJ6GEYJ683V	68KΩ	1
R20	ERJ6GEYJ470V	47Ω	1
R25	ERJ6GEYJ472V	4.7KΩ	1
R26	ERJ6GEYJ223V	22KΩ	1
R28	ERJ6GEYJ102V	1KΩ	1
R29	ERJ6GEYJ470V	47Ω	1
R31	ERJ6GEYJ682V	6.8KΩ	1
R32	ERJ6GEYJ102V	1KΩ	1
R34	ERJ6GEYJ682V	6.8KΩ	1
R35	ERJ6GEYJ101V	100Ω	1
R43~46	ERJ6GEYJ221V	220Ω	4
R47, 49	ERJ6GEYJ470V	47Ω	2
R52, 53	ERJ6GEYJ222V	2.2KΩ	2
R62	ERJ6GEYJ471V	470Ω	1
R63	ERJ6GEYJ151V	150Ω	1
R64	ERJ6GEYJ472V	4.7KΩ	1
R66	ERJ6GEYJ331V	330Ω	1
R72, 73	ERJ6GEYJ151V	150Ω	2
R75	ERJ6GEY0R00V	0Ω, M XM	1
R77	ERJ6GEYJ103V	10KΩ	1
R78	ERJ6GEYJ104V	100KΩ	1
R90, 91	ERJ6GEYJ472V	4.7KΩ	2
R92~94, 96	ERJ6GEY0R00V	0Ω	4
R100	ERJ6GEYJ221V	220Ω	1
R110, 111, 114	ERJ6GEYJ103V	10KΩ	3
R115 ⚠	ERG1SJ100	METAL FILM OXIDE RESISTOR, 1W	1
R116	ERJ6GEYJ332V	3.3KΩ	1
R117	ERJ6GEYJ472V	4.7KΩ	1
R118	ERJ6GEYJ103V	10KΩ	1
R121	ERJ6GEYJ221V	220Ω	1
R122	ERJ6GEYJ332V	3.3KΩ	1
R123	ERJ6GEYJ222V	2.2KΩ	1
R124, 126	ERJ6GEYJ101V	100Ω	2
R128	ERJ6GEYJ103V	10KΩ	1
R130, 131	ERJ6GEY0R00V	0Ω	2
R132	ERJ6GEYJ103V	10KΩ	1
R133	ERJ6GEYJ473V	47KΩ	1
R134	ERJ6GEYJ470V	47Ω	1
CAPACITORS			
C1	ECA0JM102	ALUMINIUM CAPACITOR	1
C3	ECUV1H221JG	220pF	1
C4	ECUV1H104ZFX	0.1μF	1
○ C5	ECA1EM470	ALUMINIUM CAPACITOR	1
C7	ECUV1C224KBX	CERAMIC CAPACITOR, MULTI LAYER	1
C10	ECUV1H104ZFX	0.1μF	1
C11	ECUV1H030CCN	3pF	1
C12~14	ECUV1H100DCN	10pF	3
C15	ECUV1H223KBX	0.022μF	1
C16	ECUV1H182JX	MULTILAYER CERAMIC CHIP CAPACITOR	1
C17	ECUV1H472KBG	0.0047μF	1

Ref. No.	Part No.	Description	P/S
C18, 19	ECUV1H333KBX	0.033μF	2
C20~22	ECUV1H104ZFX	0.1μF	3
C23	ECEA0JKA470	47μF, 6.3V	1
C24	FM0H473Z	0.047μ, 5.5V	1
C26	ECUV1H104ZFX	0.1μF	1
C27, 28	ECUV1H101JG	100pF	2
C31	ECUV1H104ZFX	0.1μF	1
C33~36	ECUV1H030CCN	3pF	4
C38, 43	ECUV1H104ZFX	0.1μF	2
C44	ECEA1CKA100	10μF, 16V	1
C47, 48	ECUV1H104ZFX	0.1μF	2
C49, 50	ECUV1H222KX	0.0022μF	2
C57	ECUV1H104ZFX	0.1μF	1
C58~62	ECUV1H101JG	100pF	5
C63	ECUV1H104ZFX	0.1μF	1
C64	ECA0JM102	ALUMINIUM CAPACITOR	1
C65~72, 80~91	ECUV1H104ZFX	0.1μF	20
C92	ECEA1HKA010	1μF, 50V	1
C94	ECEA0JKA101	100μF, 6.3V	1
C100	ECUV1H104ZFX	0.1μF	1
C105	ECEA1HKA010	1μF, 50V	1
C106	ECUV1H470JG	47pF	1
C107	ECA0JM102	ALUMINIUM CAPACITOR	1
C109	ECUV1H104ZFX	0.1μF	1
C110	ECUV1H101JG	100pF	1
C111~114, 116~120, 122	ECUV1H104ZFX	0.1μF	10
C123, 124	ECUV1H101JG	100pF	2
C125	ECUV1H104ZFX	0.1μF	1
C126	ECUV1E473KB	0.047μF	1
C127	ECUV1H101JG	100pF	1

CP CONTROL PANEL

Ref. No.	Part No.	Description	P/S
INTEGRATED CIRCUITS			
IC1	M37471M2196S	8 BIT MICROCOMPUTER	1
IC2	HD74LS138P	3 TO 8 DECODER	1
IC3	HD74LS07P	HEX BUFFERS	1
TRANSISTORS			
Q1~8	2SA830SB	TRANSISTOR	8
DIODES			
D1~7, 9~14, 17~22, 25~31, 33~39, 41~54, 56~63, 65~71, 73~87, 89~94, 96~104	MA165	DIODE	92
D201~205, 209, 211~213, 238, 242~244, 246, 251~254	LN382G	LED (GREEN)	18
D210, 219~222, 225~229, 233~237, 241, 245, 249, 250, 257~260	LN282R	LED (RED)	23

Ref. No.	Part No.	Description	P/S
OSCILLATOR			
X1	EF0EC4004A3	4MHz, CERAMIC OSCILLATOR	1
SWITCHES			
S1~7, 9~14, 17~22, 25~31, 33~39, 41~54, 56~63, 65~71, 73~87, 89~94, 97~105	EVQ21507K	PUSH SWITCH	92
VARIABLE RESISTOR			
VR1	EVD07205B24G	20kΩ, B	1
RESISTORS			
R1~6	ERDS2TJ680	68Ω	6
R7~22	ERDS2TJ103	10kΩ	16
R23	ERDS2TJ333	33kΩ	1
R24	ERDS2TJ102	1kΩ	1
R25	ERDS2TJ101	100Ω	1
R33	ERDS2TJ102	1kΩ	1
CAPACITORS			
C1~3, 5	ECRF1H104ZF	0.1μF	4
C6	ECEA0JKA470	47μF, 6.3V	1
C9	ECRF1H104ZF	0.1μF	1

FAJ FILTER & AMP CIRCUIT

Ref. No.	Part No.	Description	P/S
INTEGRATED CIRCUITS			
IC1	QCPL-260L	PHOTO COUPLER	1
IC3, 5, 6	M5218AL	OPERATIONAL AMPLIFIER	3
○ IC7 ⚠	LA4705NA	IC, LINER	1
TRANSISTORS			
S Q2, 3	2SA1015-GR	2SA933STRS (SUB. PART)	2
Q4	2SB941P	TRANSISTOR	1
S Q5	2SC1815GR	TRANSISTOR	1
S Q6	2SA1015-GR	2SA933STRS (SUB. PART)	1
S Q7~9	2SC1815GR	TRANSISTOR	3
S Q10, 11	2SA1015-GR	2SA933STRS (SUB. PART)	2
S Q14	2SC1815GR	TRANSISTOR	1
DIODES			
D3 ⚠	SVDS3V20	RECTIFIER	1
D7~9	MA165	DIODE	3
D13	EK04	DIODE	1
COILS			
L1 ⚠	QLQGT2T100SA	COIL	1
L3, 4, 6, 7	QLQGT3T150SA	15μH×3	4
L10	QLQGT1B800MA	80μH	1

Ref. No.	Part No.	Description	P/S
JACKS			
JK2	SJSG1370A	MIDI OUT	1
JK3	SJSG1370A	MIDI IN	1
JK5	QJJG003AA	FOOT SW	1
JK6	SJJG440A	DC IN 12V	1
JK9	SJJG100A	PHONES	1
JK10 ⚠	QJSG006AA	DC IN 12V	1
IC PROTECTOR			
IP1 ⚠	ICP-N75T104	IC PROTECTOR	1
RESISTORS			
R5	ERDS2TJ330	33Ω	1
R6	ERDS2TJ331	330Ω	1
R7	ERDS2TJ151	150Ω	1
R8	ERDS2TJ224	220kΩ	1
R9	ERDS2TJ221	220Ω	1
R10, 12	ERDS2TJ102	1kΩ	2
R13, 14	ERDS2TJ153	15kΩ	2
R15, 16	ERDS2TJ473	47kΩ	2
R17, 18	ERDS2TJ101	100Ω	2
R19, 20	ERDS2TJ102	1kΩ	2
R23, 24	ERG1SJ100	METAL FILM OXIDE RESISTOR, 1W	2
R25, 26	ERG1SJ221	220Ω, 1W	2
R27	ERDS2TJ104	100kΩ	1
R28	ERDS2TJ682	6.8kΩ	1
R29	ERDS2TJ473	47kΩ	1
R30	ERDS2TJ222	2.2kΩ	1
R31	ERDS2TJ102	1kΩ	1
R34, 35	ERDS2TJ222	2.2kΩ	2
R36	ERDS2TJ103	10kΩ	1
R37, 38	ERDS2TJ153	15kΩ	2
R39, 40	ERDS2TJ224	220kΩ	2
R51, 52	ERDS2TJ103	10kΩ	2
R53, 54	ERDS2TJ124	120kΩ	2
R55, 56	ERDS2TJ823	82kΩ	2
R59, 60	ERDS2TJ103	10kΩ	2
R61, 62	ERDS2TJ682	6.8kΩ	2
R67~70	ERD25FVJ2R2	2.2Ω, 1/4W, FLAME-PLOOF	4
R71, 72	ERDS2TJ103	10kΩ	2
R73 ⚠	ERD2FCVJ4R7	4.7Ω, 1/4W, FUSE TYPE	1
R79, 80	ERDS2TJ682	6.8kΩ	2
R81	ERDS2TJ473	47kΩ	1
CAPACITORS			
J19	ECKF1E473ZV	0.047μF	1
C3	ECCR1H221J	220pF	1
C4~6, 8~11	ECKF1E473ZV	0.047μF	7
C13	ECA1EM472	ALUMINIUM CAPACITOR	1
C15	ECA1CM331	ALUMINIUM CAPACITOR	1
○ C16	ECA1CM102	ALUMINIUM CAPACITOR	1
C17, 18	ECQB1H333JF	0.033μF	2
C19, 20	ECQB1H393JF	0.039μF	2
○ C21	ECA1EM470	ALUMINIUM CAPACITOR	1
C25, 26	ECQG1H152KZ	0.0015μF	2
C27, 28	ECQG1H682KZ	0.0068μF	2
C29, 30	ECQG1H152KZ	0.0015μF	2
C32	ECEA1EKA100	10μF, 25V	1
C33~36	ECEA1HKA010	1μF, 50V	4
C37, 38	ECQG1H102KZ	0.001μF	2
○ C39	ECA1EM470	ALUMINIUM CAPACITOR	1
C40	ECEA0JKA470	47μF, 6.3V	1
C43~46	ECRF1H104ZF	0.1μF	4
C50	ECEA0JKA470	47μF, 6.3V	1
C51, 52	ECQV1H684JM	0.68μF	2

Ref. No.	Part No.	Description	P/S
C53, 54	ECCR1H330J	33pF	2
C55, 56	ECA1CM101	ALUMINIUM CAPACITOR	2
C59, 66	ECKF1E473ZV	0.047μF	2
C72	ECQV1H104JM	0.1μF	1
C100	ECKF1E473ZV	0.047μF	1
C101, 102	ECQG1H472KZ	0.0047μF	2

LAMP1 LAMP 1 CIRCUIT

Ref. No.	Part No.	Description	P/S
LAMPS			
○ LP1, 2	QHQG005AA	INCANDESCENT LAMP	2

BATT– BATTERY – CIRCUIT

Ref. No.	Part No.	Description	P/S
SPRING			
SPR1	SJCG20A	SPRING	1

MKB1 MANUAL KEYBOARD 1 CIRCUIT

Ref. No.	Part No.	Description	P/S
INTEGRATED CIRCUIT			
IC1	HD74LS138P	3 TO 8 DECODER	1
DIODES			
D1~48	MA165	DIODE	48
CAPACITORS			
C2, 3	ECRF1H104ZF	0.1μF	2

MKB2 MANUAL KEYBOARD 2 CIRCUIT

Ref. No.	Part No.	Description	P/S
INTEGRATED CIRCUIT			
IC2	HD74LS138P	3 TO 8 DECODER	1
DIODES			
D49~96	MA165	DIODE	48
CAPACITORS			
C4, 5	ECRF1H104ZF	0.1μF	2
C6	ECEA1CKA470	47μF, 16V	1

MKB3 MANUAL KEYBOARD 3 CIRCUIT

Ref. No.	Part No.	Description	P/S
DIODES			
D97~122	MA165	DIODE	26

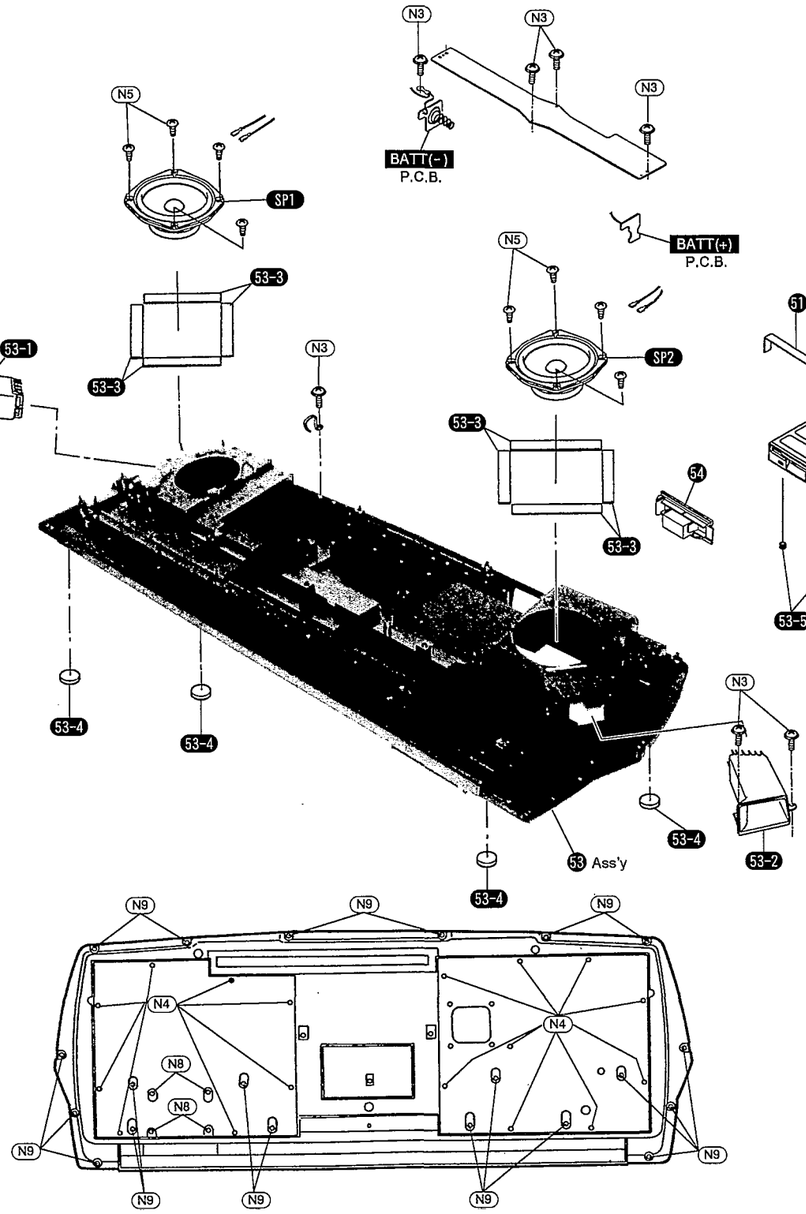
INS (BEND) PITCH BEND CIRCUIT

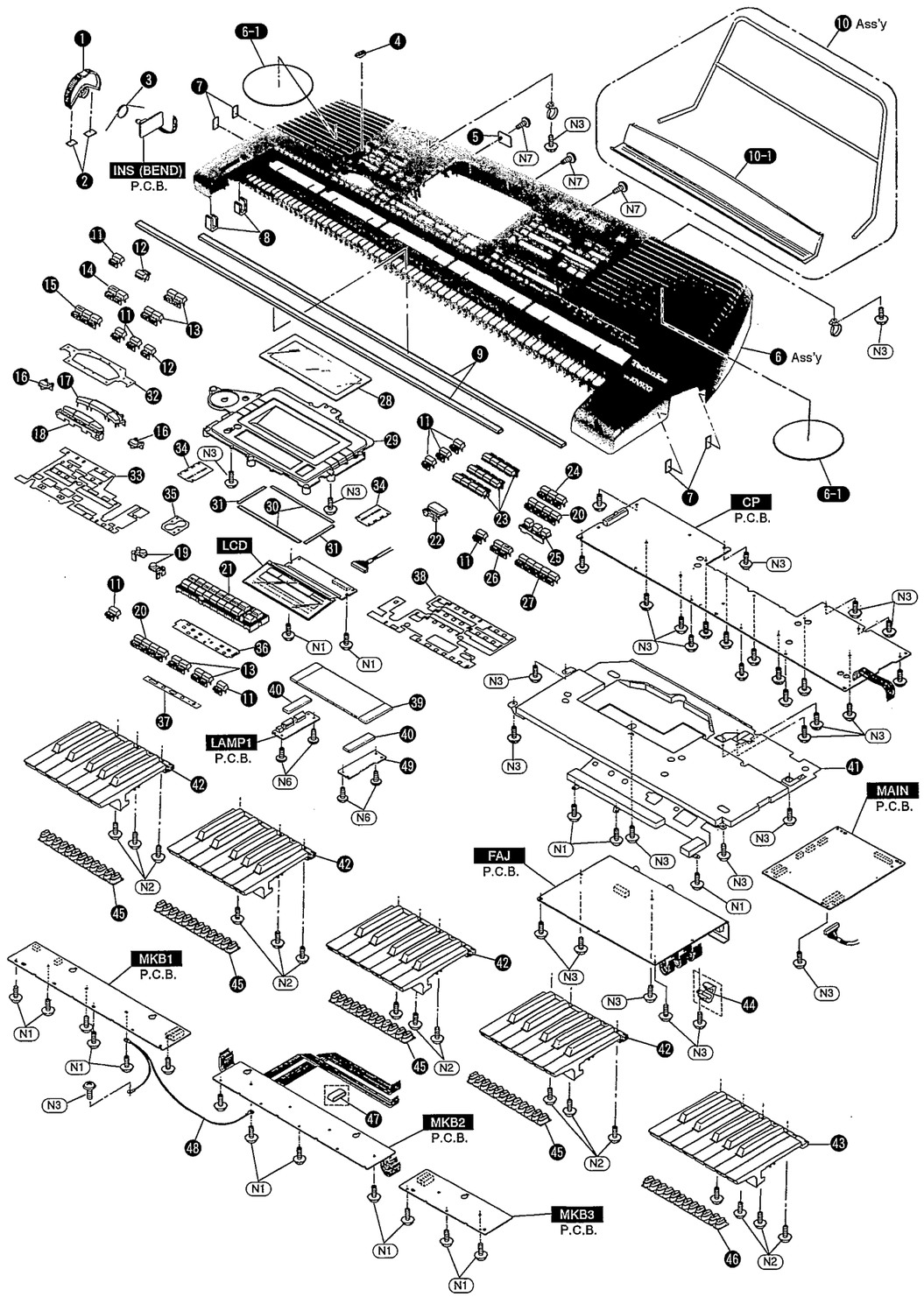
Ref. No.	Part No.	Description	P/S
VARIABLE RESISTOR			
VR1	QRVG16A02B54	50kΩ, B	1
RESISTORS			
R1, 2	ER0S2CKF1001	1kΩ, ±1%	2

■WIRING PARTS

Ref. No.	Part No.	Description	P/S
○ W1	QEXGSS03008B	COMMU CABLE W/ PLUG	1
○ W2	QEXGVH06105B	COMMU CABLE W/ PLUG	1
○ W3	QEXGZA34055A	COMMU CABLE W/ PLUG	1
○ W4	QEXGSS14050B	COMMU CABLE W/ PLUG	1
○ W5	QEUGS8W10BZ	COMMU CABLE W/ PLUG	1
○ W6	QEUGS7W30BZ	COMMU CABLE W/ PLUG	1
○ W7	QEUGSAW30BZ	COMMU CABLE W/ PLUG	1
○ W8	QEUGS8W06BZ	COMMU CABLE W/ PLUG	1
○ W9	QEUGS3W10BZ	COMMU CABLE W/ PLUG	1
○ W10	QEUGS8W06BZ	COMMU CABLE W/ PLUG	1
○ W11	QEUGS7W06BZ	COMMU CABLE W/ PLUG	1
○ W12	QEUGS6W06BZ	COMMU CABLE W/ PLUG	1
○ W13	QEUGSAW08BZ	COMMU CABLE W/ PLUG	1
○ W14	QEUGS9W06BZ	COMMU CABLE W/ PLUG	1
○ W15	QEUGS8W08BZ	COMMU CABLE W/ PLUG	1

CABINET PARTS LOCATION





REPLACEMENT PARTS LIST.....Cabinet and Chassis Parts

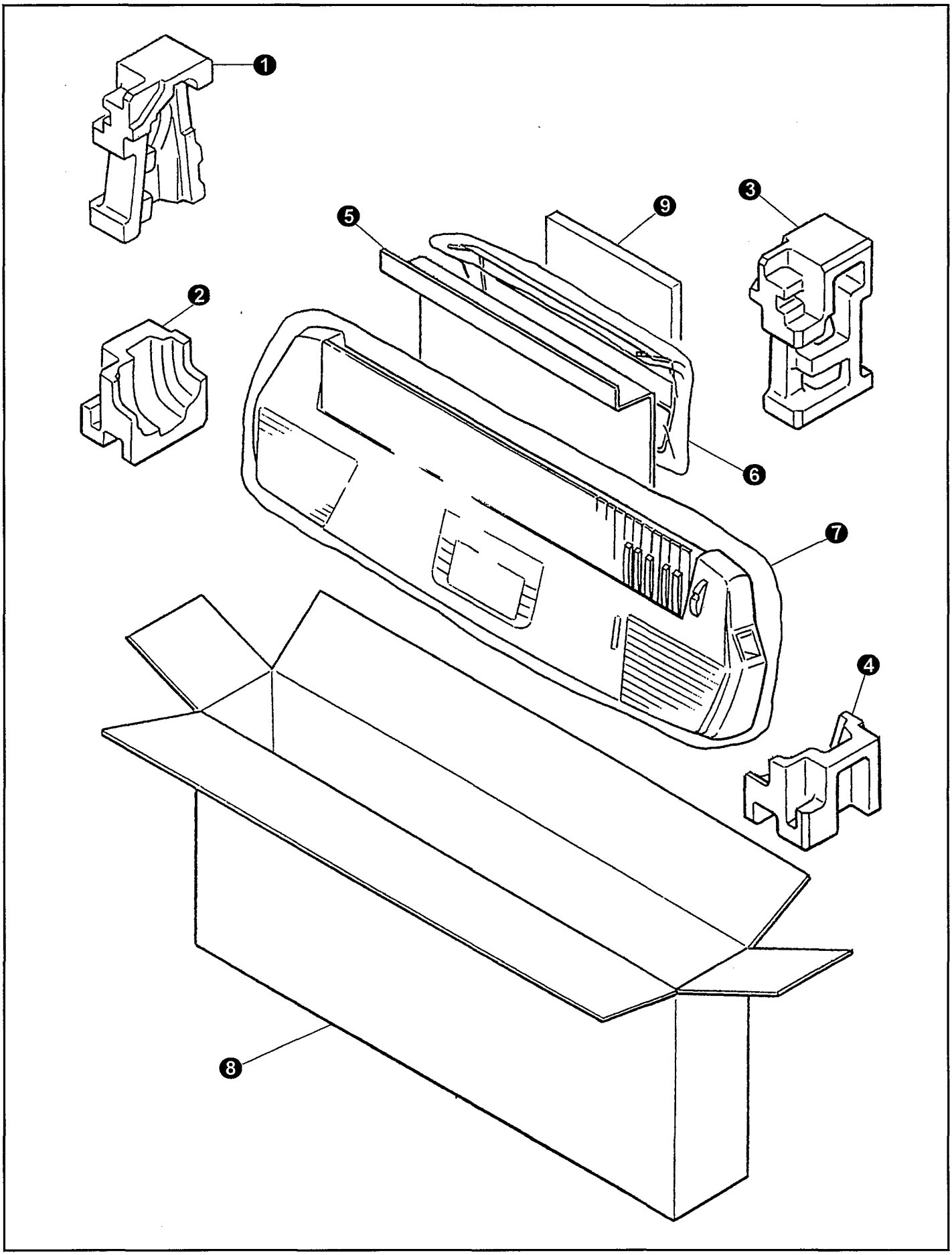
Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. ○ mark are new parts.
3. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
4. For part No. with area mark, check the area when placing an order.
5. The raw material indication for synthetic resin
   In order to facilitate classification of parts of synthetic resin manufacture and to promote the recycling of natural resources, a raw material symbol for such parts is indicated in the Ref. No./ Material column.

■CABINET & CHASSIS PARTS

	Ref. No.		Part No.	Description	P/S
			SPEAKERS		
	SP1, 2		EAS12P458A3	SPEAKER, 12cm, 4Ω	2
			CABINET PARTS		
	1	ABS	SBNG4050A	WHEEL KNOB	1
	2		QMFG4076AAK	FELT	2
	3		QMBG012AAK	SPRING	1
	4	ABS	SBNG7070B	KNOB, MAIN VOLUME	1
	5	PS	QKSGF007AA	DC IN COVER	1
○	6		QYPG1071BAK	CABINET BODY	1
	6-1		[QMFG4128AAK	SPEAKER NET	2
	7		QMFG4110AA	FELT	4
	8		QMFG4167AAK	CUSHION	2
	9		SHSG1970A	FELT	2
	10	⚠	QYAG3004AAK	MUSIC STAND ASS'Y	1
	10-1	PS	[QMRG7065AAK	TABLE OF MUSIC BOOK	1
○	11	ABS	QGUG1435AAK	PUSH BUTTON	9
○	12	ABS	QGUG1435ABK	PUSH BUTTON	2
○	13	ABS	QGUG1436AAK	PUSH BUTTON	4
○	14	ABS	QGUG1436AA1K	PUSH BUTTON	1
○	15	ABS	QGUG1437AA1K	PUSH BUTTON	1
○	16	ABS	QGUG1367ACK	PUSH BUTTON	2
○	17	ABS	QGUG1385AB1K	PUSH BUTTON	1
○	18	ABS	QGUG1384AB1K	PUSH BUTTON	1
○	19	ABS	QGUG1392BBK	PUSH BUTTON	2
○	20	ABS	QGUG1438AAK	PUSH BUTTON	2
	21	ABS	QGUG1420AA	PUSH BUTTON	1
○	22	ABS	QGUG1366ACK	PUSH BUTTON	1
○	23	ABS	QGUG1438ABK	PUSH BUTTON	3
○	24	ABS	QGUG1437AAK	PUSH BUTTON	1
○	25	ABS	QGUG1369BCK	PUSH BUTTON	1
○	26	ABS	QGUG1436AA2K	PUSH BUTTON	1
○	27	ABS	QGUG1439AAK	PUSH BUTTON	1
○	28		QKWG029AAK	PLATE	1
○	29	PS	QGPG0120ABK	ORNAMENT, PS	1
○	30		QMRG5123AAK	CUSHION	2
○	31		QMRG5124AAK	CUSHION	2
○	32		QMRG5137AAK	CUSHION	1
○	33		QMFG4179AAK	CUSHION	1
○	34		QMFG4183AAK	CUSHION	2
○	35		QMRG5138AAK	CUSHION	1
○	36		QMFG4184AAK	CUSHION	1
○	37		QMFG4181AAK	CUSHION	1
○	38		QMFG4180AAK	CUSHION	1
○	39		QMRG7080AA	PLATE	1
○	40		QMRG5121AAK	SPACER	2
○	41		QSCG092AK	MAGNETIC SHIELD	1
	42	ABS	QMWG9020AAK	12 KEYS	4
	43	ABS	QMWG9021AAK	13 KEYS	1
	44		QLZG006A	CORE, EN M MC XM EZ EK EW EF EA EP EH XL XR XP	1
	45		QMWG6015CAK	RUBBER SWITCH (12 PCS.ON ONE)	4
	46		QMWG6014CAK	RUBBER SWITCH (13 PCS.ON ONE)	1
	47	⚠	QLZG013A	CORE, EN M MC XM EZ EK EW EF EA EP EH XL XR XP	1
○	48		QEXGRA01020F	WIRE	1
○	49		SXPG226811F	LAMP2	1
	50		QMFG4103AA	FELT	1
	51		QMFG1204AA	FELT	1
	52		QAUG012AA	DDR DRIVE UNIT	1
○	53		QYKG192CAK	CABINET BODY	1
○	53-1	PS	QMRG7078ABK	SOUND PORT, LEFT	1
○	53-2	PS	QMRG7079ABK	SOUND PORT, RIGHT	1
○	53-3		QMRG5099AAK	CUSHION	8
	53-4		QMRG7070AAK	FOOT	4
	53-5		QMGG041AA	SPACER	4
○	54		QKSGF019AA	BATTERY COVER	1
			SCREWS & WASHERS		
	N1		XTW3+10QFZ	SCREW	16
	N2		XTW3+20Q	SCREW	16
	N3		XTW3+12Q	SCREW	48
	N4		XTT4+20AFZ	SCREW	17
	N5		XTV3+10GFZ	SCREW	8
	N6		XTV3+12G	SCREW	4
	N7		XTW3+14TFZ	SCREW	3
○	N8		QHDG043AA	SCREW WITH WASHER	4
	N9		XTW3+20QFZ	SCREW	24

PACKING



■PACKING PARTS

Ref. No.	Part No.	Description	P/S
PACKING PARTS			
○ 1 PS	QPNG0584AAK	PAD	1
○ 2 PS	QPNG0582AAK	PAD	1
○ 3 PS	QPNG0583AAK	PAD	1
○ 4 PS	QPNG0581AAK	PAD	1
○ 5	QPGG0349AAK	CUSHION, PAPER	1
6 PE	SPHG1770A	POLYETHYLENE BAG	1
7 PE	QPFG002AA	POLYETHYLENE BAG	1
○ 8	QPGG0348AAK	PACKING CASE, PAPER	1
OPERATING INSTRUCTION MANUAL			
○ 9	QQFGKN1500AA	OPERATING INSTRUCTION MANUAL, EN	1
○ 9-1	QQTG0405A	DANSK	1
○ 9-2	QQTG0406A	ENGLISH	1
○ 9	QQFGKN1500BA	OPERATING INSTRUCTION MANUAL, M	1
○ 9	QQFGKN1500CA	OPERATING INSTRUCTION MANUAL, MC	1
○ 9-1	QQTG0406A	ENGLISH	1
○ 9-2	QQTG0408A	FRANCAIS	1
○ 9	QQFGKN1500DA	OPERATING INSTRUCTION MANUAL, EZ	1
○ 9	QQFGKN1500EA	OPERATING INSTRUCTION MANUAL, EK XS XL XR	1
○ 9	QQFGKN1500FA	OPERATING INSTRUCTION MANUAL, EW	1
○ 9-1	QQTG0408A	FRANCAIS	1
○ 9-2	QQTG0409A	DEUTSCH	1
○ 9-3	QQTG0410A	ITALIANO	1
○ 9	QQFGKN1500GA	OPERATING INSTRUCTION MANUAL, EF	1
○ 9-1	QQTG0408A	FRANCAIS	1
○ 9-2	QQTG0410A	ITALIANO	1
○ 9	QQFGKN1500HA	OPERATING INSTRUCTION MANUAL, EA	1
○ 9	QQFGKN1500JA	OPERATING INSTRUCTION MANUAL, EP XP XM	1
○ 9-1	QQTG0406A	ENGLISH	1
○ 9-2	QQTG0412A	ESPANOL	1
○ 9	QQFGKN1500KA	OPERATING INSTRUCTION MANUAL, EH	1
○ 9-1	QQTG0411A	NERDERLANDS	1
○ 9-2	QQTG0408A	FRANCAIS	1
○ 9-3	QQTG0409A	DEUTSCH	1
○ 9	QQFGKN1500LA	OPERATING INSTRUCTION MANUAL, X	1
○ 9-1	QQTG0406A	ENGLISH	1
○ 9-2	QQTG0412A	ESPANOL	1
○ 9-3	QQTG0413A	中文	1
○ 9	QQFGKN1500MA	OPERATING INSTRUCTION MANUAL, XD	1
○ 9-1	QQTG0406A	ENGLISH	1
○ 9-2	QQTG0413A	中文	1
○ 9	QQFGKN1500NA	OPERATING INSTRUCTION MANUAL, XT	1

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